

Contractors and Engineers Monthly

Vol. 36, No. 8

AUGUST, 1939

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Highlights Of This Issue

• Swing Span Over Canal

"Swing it" seems to be the watch word of the present day, and can well be applied to the recently constructed 136-foot steel-girder electrically-operated swing span over the Houma Canal at Houma, La., which replaces an old wooden span. The details of its construction are described in this issue.

See page 2.

• Repairing Flood Damage

Everything in California is described in superlatives and when they have a flood out there, it too is "super-colossal." To repair the damage to the Merced Canyon highway caused by the December, 1937, flood and to prevent a repetition of such havoc, a \$605,500 contract is under way for backfilling missing sections of the road, rock embankments and walls, and repaving.

See page 2.

• Roadside Development

Connecticut's program for roadside development, based on greater safety, economy, utility and aesthetic value, is discussed in this issue.

See page 7.

• Aggregates for Road Job

The contractor for a 3.45-mile bituminous macadam paving job near Austin, Texas, set up a complete screening and crushing plant at the site where all aggregates, taken from a river and hauled 7 miles to the job, were processed and stockpiled ahead of paving.

See page 11.

• Low-Cost County Roads

Successful experiments in the construction of low-cost roads, using tar as the stabilizing material, have been carried out in St. Joseph County, Ind.

See page 15.

• More Troubles in Alaska

The construction of an airport at Bethel, Alaska, provided as many, if different, difficulties as did the road described in our July issue. The airport-construction problems and their solution are described in this issue.

See page 19.

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Hydraulic Brooms Speed Surfacing

Joseph R. Cothran, Jr., Had Interesting Methods On State Road Project Near Lexington, Ga.

† AN hydraulically operated gang broom for the final seal on a Georgia surface-treatment project is the latest addition to our collection of "equipment that is to be." Many of the accepted pieces of equipment today have been the results of the ingenuity of a contractor's superintendent, and the palm for this device goes to G. W. Beale, Superintendent for Joseph R. Cothran, Jr., contractor for 5 miles of surface treatment on a stabilized top-soil base on the Lexington-Elberton road just outside of Lexington, and to J. R. Hitchcock, Resident Engineer for the State on a previous job.

The machine is based on the well-known Gledhill hydraulically controlled maintainer equipped with 12-foot runners on either side to iron out the ripples in a road and give a long smooth base for the maintainer blades. The hydraulic control, a simple hand pump for lifting and a valve that is just cracked for lowering, permits light or heavy pressure on the road. The forward blade slopes diagonally back to the right and stops about one foot from the right runner. The second blade slopes back to the left and runs the entire width of the machine. At the back a strike-off blade spreads the material. So much for the maintainer. Just replace the blades with brooms and you have an ideal broom for the seal coat on a Georgia surface-treatment road. The second diagonal broom can be lifted by the wheel control at the left end so that the material that is being swept to the side can be "spilled" across

(Continued on page 16)

Levee Enlargement With Crawler Wagons Provides Roadway



At Left, Earl Bergen, Dragline Operator; Lytle Brown, Jr., Superintendent; and V. G. Emge, Civil Engineer, for L. O. Brayton Construction Co.

† THE Upper Union Point levee on the west side of the Mississippi River some 45 miles south of Natchez, Miss., was slightly below a safe elevation if there were a repetition of the 1937 flood stage. To strengthen this section, a contract for placing 100,000 yards was awarded to Forcum-James Co. and subbed to L. O. Brayton Construction Co., Dyersburg, Tenn., at 33 cents per yard. The work included widening the old 8-foot crown to 20 feet to provide a roadway on top of the levee, a 1 on 3.5 river-side slope with a false berm and a 1 on 3 land-side slope. The crown was raised an average of 2 feet and the work required the placing of 2,500 yards per station for four-fifths of a mile along the levee in a section that was well nigh inaccessible in wet weather.

The old levee borrow pits on the river side were 300 feet wide and had to be crossed to secure material for the enlargement. These pits normally contained from 7 to 8 feet of water and when

L. O. Brayton Co. Raises Upper Union Point Levee And Hauls 2,500 Yards Per Station Across Old Pits

(Photo on page 40)

there was a rain of 2 inches the water would rise nearly 5 feet as the entire section for $\frac{1}{2}$ mile drained toward the levee. A 6-inch Jaeger Sure-Prime pump was used in the pits all the time to keep the water as low as possible, to drain the new borrow pits at a slightly higher elevation than the old. The new pits consisted of buckshot and gumbo with some blue clay and were filled with cypress stumps. Frequently it was necessary to strip off 2 feet of the surface material to prevent the machine bogging down as the impervious material below held the water in the surface.

Building Crossings

Brayton started the work January 18, 1939, setting up a camp on the river side of the levee at the center of the job. This had to be moved back to the land side about February 18, when work had been shut down, because it was necessary to open a small dam the contractor had placed across a bayou where a railroad trestle crossed. The water was rising rapidly and for safety he cut the dam and flooded the pits.

Starting at the upper end of the work so as to permit draining the section with the pump, the contractor built the first few stations of the enlargement and then had to build a crossing over the old pits. This was done with two crawler wagons hauling and a bulldozer to grade the material. It required about 12 hours and 1,500 yards of material to build a crossing and they had to be built every 400 feet. As the wagons moved over the crossings, they gradually spread and had to be built up so that before they were abandoned fully 3,000 yards of material had been placed in each one.

Dirt-Moving Equipment

The contractor used a Northwest dragline with a 45-foot boom and powered with a 175-hp Murphy diesel engine to swing the $2\frac{1}{4}$ -yard Page automatic semi-rock bucket. This loaded the fleet of crawler wagons consisting of one 18-yard Athey, three 12-13-yard Tracksons and three 10-12-yard Euclids. For hauling, the following crawler tractors were used: two Caterpillar D8, two Caterpillar RD8, and one Caterpillar 75 diesel. An Allis-Chalmers Model

(Concluded on page 12)

PREPARING AGGREGATES ON THE JOB



C. & E. M. Photo

The Screening and Crushing Plant Set Up by H. B. Zachry Co. for Boulevard Paving North of Austin, Texas. See Page 11.

Swing Span Erected Over Houma Canal, La.

New Structure Replaced Old Bridge Wrecked by Heavy Truck, Has 136-Foot Span Built by Robinson & Young

(Photo on page 40)

† THE Old Spanish Trail, U.S. 90 to most motorists, crosses the Houma Canal at Houma, La., some 70 miles west of New Orleans. Two years ago a heavy truck crashed through the old wooden span, making it necessary to erect a new bridge. A temporary wooden pontoon bridge was erected a few hundred feet from the old site and traffic used this pending completion of the design and construction of the new 136-foot steel-girder electrically operated swing span. The bid of Robinson & Young of Baton Rouge, La., was accepted and work was started October 1, 1937, under a 240-working-day contract.

The Swing-Span Pier

There are four piers in the structure, numbered from south to north as 1 to 4. Pier 3 on the north bank of the canal is the swing-span pier and involved the greater problems in construction. The first operation was the driving of a circular cofferdam 28 feet 10 inches in diameter, using 35-foot lengths of Inland steel sheet piling driven by a McKiernan-Terry No. 7 steam hammer swung by a stiffleg derrick. The cofferdam was unwatered with a 4-inch diaphragm pump to 14 feet below the elevation of the water in the canal after excavation had been completed with a ¾-yard clamshell operated from the stiffleg derrick.

After the unwatering was complete, a test pile was driven and loaded to determine the length of piles which would be needed under the 26-foot diameter footing to support the structure. The test pile gave a bearing of 16 tons in driving and 32 tons under load with a permanent settlement of 1/16 inch under load. This led to the driving of forty-four untreated timber piles 50 feet in length with tips 7 inches and butts 14 inches in diameter, to carry 1,471,000 pounds dead load. The timber piles were driven with a No. 2 Vulcan hammer.

Following the completion of the driving, the cofferdam was washed out, the piles cleaned, and 6 inches of shell placed and tamped on which was placed the 26-foot diameter x 5-foot high footing with the piles projecting 18 inches into the concrete. This footing carries a 22-foot diameter barrel on which is a 24-foot diameter cap. The plant set-up for the pouring of the footing included a 2-bag CMC Silverstreak mixer which delivered the concrete to a bottom-dump bucket handled by the stiffleg derrick. The footing is reinforced with mats of

1-inch square bars on 12-inch centers both ways top and bottom.

The barrel section consists of an 18-inch circular wall with two 18-inch cross walls at 90 degrees reinforced with ½-inch square bars on 12-inch centers both vertically and horizontally near the inside and outside faces of the wall. Where the walls cross at the center of the structure they are mitered to form a column 3 feet square which is heavily reinforced with 1-inch bars vertically and ½-inch hoop bars, all on 12-inch centers. This central column carries the dead load of the steel span through the center bearing casting.

The Other Three Piers

Pier 1 on the south bank has four pedestals each on four 55-foot piles with

each pedestal carrying one column. The pedestal or footing is 11 feet higher than those of Piers 2 and 3 which are at the edge of the bank, and measures 5 feet 6 inches square and 3 feet high. The foundation piles extend 24 inches into the footings with a mat of ¾-inch round bars and ¾-inch round hoop bars over the piles. The columns are 2 feet 6½ inches x 2 feet at the bottom and 2 feet square at the top, battered at the back, and are 6 feet 5 inches high. They carry a cap 2 feet 6 inches wide, 2 feet deep and 43 feet 6 inches long. Reinforced wing walls at the ends of the cap extend upward to hold the fill. These two walls are 5 feet 3 inches long along the cap, 3 feet 8½ inches high and 1 foot 3 inches thick.

Pier 4, forward of Pier 3, the swing-span pier, on the north bank has its footing at the same elevation as Pier 1 and measures 40 feet 6 inches long, 6 feet wide and 3 feet deep. The 18 piles for the foundation extend 24 inches into the footing. The footing carries a re-

(Continued on page 14)



C. & E. M. Photo
The End of a Heavy Rock Embankment, with Highway Fill Being Placed

Repairing a Canyon Is Not An Easy Job

Merced Canyon Highway To Yosemite, Washed Out In December, 1937. Is Being Rebuilt by Mittry Bros.

(Photo on page 40)

† WHEN the snows melt in the Sierras, the streams flowing to the valleys rise, but when 12 inches of rain falls in 48 hours snow and rain rage through the canyons and cause untold havoc. That is the story of the damage to 13 of the 16 miles of California State Route 140 in Merced Canyon in the storm of December 11-12, 1937, reducing 50 per cent of the highway to one-way traffic. The previous all-time peak flow of the Merced River was reached in 1862 when 50,000 cfs tore down the steep stream bed. The

1937 flow reached 72,000 cfs and vented its destructive force on both highway and railroad, the Yosemite Valley Railroad on the north side of the canyon opposite the highway, and did considerable damage within the Yosemite National Park as well.

Pictures of the flood at its height show the water running higher in midstream than at the banks, and where knobs of hard rock projected into the stream its attack was directed across the channel and the railroad or highway completely washed out. The week-end destruction of the highway and railroad left a large CCC camp and many visitors to the Park for winter sports stranded with short rations as the other entrances to the Park were blocked with snow. Food was sent in by airplane while the state highway maintenance forces tackled the repair job which is still under way. In three days the highway was opened to one-way traffic running under controls from gates across the highway at Indian Lodge on the east and Bear Creek Bridge at Briceburg on the west, but the work of repair is still a long way from being completed.

The estimated cost of restoring a two-way highway and protecting critical points from further erosion is about \$800,000, of which \$45,000 was spent by the maintenance forces in its 24-hour a day emergency work with day labor. Of the balance, \$605,500 is now under contract to Mittry Bros. of Los Angeles, Calif., for the backfilling of missing sections of the highway, cutting into the bank to secure a better line and firmer foundations, for rock embankments and rubble masonry walls, and for recon-

(Continued on page 32)



Work Near the Middle of the Tunnel

Road Tunnel Dug From Inside Out

Multnomah County, Ore., Used Unusual Method for 225-Foot Bore

By HENRY W. YOUNG

† DIGGING a tunnel both ways from the middle was the unusual procedure in a 225-foot bore known as the Burnside Tunnel Project of Multnomah County, Oregon. This is a 34-foot circular tunnel, provided with an 8-inch concrete lining, on a grade of approximately 9 per cent. It was constructed in connection with the Barnes Road Project of about 2 miles, extending from just within the city limits of Portland at one end and a few hundred feet into Washington County at the other. Both were county WPA projects.

The tunnel is under a hill of clay hardpan which, in the wet winter season, is plain muck. It was necessary to start the tunnel when this muck was at its worst but to have worked from the ends would have meant a constant sloughing down of the muck and water in getting started, which would have continued from the hillside above until the job would have ended in practically cutting a ravine through the hill before they could get in under.

The County was fortunate in securing the services of W. R. Thomas, an old timer in all kinds of tunnel work, including railroads, and more lately on the Bonneville Dam Project. He sized up the situation and went at the job with characteristic reasoning: "If you can't dig 'er from the outside in, do it from the inside out."

First came the 5 x 7-foot pilot tunnel at the top of the arch, excavated clear through the hill. Next came the two side tunnels at the bottom, of like cross section and excavated in 120 feet, to about the middle. In timbering the latter, traps were left in the roofs, covered with planks, the reason for which will be seen later. Space was left at the bottom, between the two outside rows of temporary posts, in which to excavate the trench for the concrete footing to carry the permanent posts, this footing being 12 inches thick and 3 feet wide.

When the side tunnels were in and the concrete ready for the posts, the scene of action was transferred to under the middle of the hill. Excavation was started here for the first row of permanent posts and roof segments. The muck was excavated, starting from the pilot tunnel, and thrown down through open traps in the side tunnel roofs, and the material fell directly into hoist-drawn Swede cars on the track beneath. As soon as the first ring of 12 x 12-inch fir segments was in place on permanent posts, excavation was continued toward the south entrance, and the next row of timbers and segments set up. The tunnel was extended in this manner in both directions to completion, leaving a core for final excavation as usual. No blasting was required.

The advantage of this method is that the work could proceed in the wettest

(Concluded on page 20)



C. & E. M. Photo
Sidewalk Forms and Reinforcing. The Operator's House in the Background.



COLORADO CONTRACTOR BUILDS MIDGET RACE TRACK

In Lakeside Park, Denver, Colo., this midget race track is being surfaced with a plant-mix of TEXACO MC Cutback Asphalt and coarse aggregate, laid to a compacted thickness of 3 inches.



INDIANA CONTRACTOR RESURFACES WORN CONCRETE ROAD

For 6½ miles south of Naplesville, Ind., the worn-out surface of Route 13 is being used as base for a two-course TEXACO Asphalt Concrete pavement, 3¾ inches thick.



CONNECTICUT CONTRACTOR CONSTRUCTS ASPHALT MACADAM HIGHWAY

On this section of Connecticut State Route No. 68, an Asphalt Macadam surface is being constructed, using a TEXACO Asphalt Cement of 90-100 penetration.

These three contractors are hundreds of miles apart. Their three jobs are radically different. But in choosing a brand of asphalt, all three contractors arrive at the same decision—TEXACO.

Whether in Colorado, Indiana, Connecti-

cut—or anywhere else east of the Rockies—road building contractors can depend upon TEXACO Asphalt products and the third-of-a-century old organization behind them.

On your next job, talk Asphalt with TEXACO!



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Road Builders and the Public

In any consideration of the "unsung heroes" of the world, certainly the road builders must be included. Those of us connected with this vast and important industry would like to see the general public made aware of the obstacles and difficulties met and overcome, of the time and energy and pride in workmanship which have gone into the construction of the network of highways in the United States. But this is only a part of an educational program to which the general public and legislators may well be subjected. Still more important than the efforts of highway engineers and contractors is the question of where the money for roads comes from and where it goes; what is the part played by the road-building industry in the economic drama today; and what of the future of roads and road builders.

The public has a vague idea that some one pays for the highways over which it drives, and it knows too that a goodly share of the gasoline dollar goes for taxes, but what happens to that money after it leaves the motorist's pocket has been a matter of too little concern to most people.

Believing that, if the road construction industry is to play its part in the march toward greater prosperity and progress, the people of this country must be more completely informed, we were happy to learn that the Illinois Road Builders Association has retained the services of a public relations counsel to shape a program of education and information for the coming year, one of the major objectives of which will be discouragement of the state's gasoline tax diversion policy.

The value of educational campaigns such as the American Road Builders' Association and other organizations interested in good roads are carrying on has been demonstrated in a number of states where an active educational program was followed by a popular vote making gas tax diversion unconstitutional. It seems only logical to assume that the public, once it knows the insidious and unfair effects of diversion, will no longer tolerate it, and insist that the money it pays for roads go where it belongs—for the construction and maintenance of better, safer highways in this country.

A Word to the Wise—

It frequently pays contractors in dollars and cents to heed the sound advice of resident engineers. On a recent trip we ran into some interesting situations where experienced resident engineers on state highway projects had given good advice to contractors, greatly furthering the economic completion of the work. The most illuminating case had to do with the operation of a hot-mix plant, where the resident engineer noticed an unusual amount of dust around the plant.

He called the attention of the contractor to the loss of fines up the drier stack and suggested the installation of a dust collector of an approved type. The contractor did not consider his losses sufficient to cause any mental worry or to affect his pocketbook. The contractor

was buying sand from a local producer so there was a ready check on the amount that had been delivered and the batch weight quickly showed how much had been used. At the time the engineer and contractor got together and checked these weights, the contractor had purchased 7,000 tons of sand, had no stockpile, and had put only 5,000 tons into the batches in his hot-mix plant. The answer was simple. Most of the missing 2,000 tons had been blown up the stack.

To be certain of their conclusion, the two men checked the stone weights on

Brick Droppers—Not Layers—Proper Term

To the Editor

CONTRACTORS AND ENGINEERS MONTHLY

We have read with interest the article on "Paving-Brick-Laying Champions" in the June issue of CONTRACTORS AND ENGINEERS MONTHLY. While there is no question that these expert workmen have developed a high degree of skill, the discussion is in error at one point in that mention is made of lifting the brick. The operation is not one of lifting but rather one of dropping. In other words, the force of gravity is on their side and in the language of the art, they are known as brick droppers and not as brick layers.

I am enclosing an article which appeared in our quarterly magazine *Dependable Highways* in 1936 relative to a number of these speed champions, references to whom appeared in the public press of that year. We have also referred in our literature and bulletins to the publicity given to Roy Swinford and E. J. Connolly mentioned in your article, as well as a number of others.

As stated in our *Dependable Highways* article, a word to contractors cautioning them not to use such unusual records in computing their bids is advisable.

Yours very truly,

G. F. Schlesinger,

Engineer-Director

National Paving Brick Assn.

Washington, D. C.

June 24, 1939.

A. E. D. Meeting

The semi-annual meeting of the Associated Equipment Distributors was held the latter part of June in Chicago. The first day was given over to the reports of committee chairmen and general business while the second day was Manufacturers' Day when seventy-one manufacturers were present. The following papers were presented: "As We Find Ourselves Today," on the problems of distributors of construction equipment and their solutions, by A. F. Sersanos, President of the Board of Governors of the A. E. D.; "The Miller-Tydings Law As We Think It Might Be Applied to Our Industry" by W. G. Morgan, Second Vice President of the A. E. D.; and "Re-employment in Construction" by W. A. Klinger, a past president of the Associated General Contractors of America.

the same batches and found that receipts and deliveries of raw and mixed materials checked very closely, showing that it was the strong blast from the blower that was the cause of the loss of almost one-third of the sand bought and paid for by the contractor. A dust collector was installed and after that the fines went into the batch.



"Yep, They Had to Open the Main Road Until They Get the Detour Fixed"

County Maps Available In State Highway Offices

Detailed county maps, showing all highways and much other information, are being prepared for all counties in the United States except those in New York and Delaware. These maps are one of the products of the highway planning surveys which are being conducted by the Public Roads Administration (formerly the U. S. Bureau of Public Roads) and forty-six state highway departments. The total mileage inventoried in these states in which surveys were made is about 2,872,000 miles.

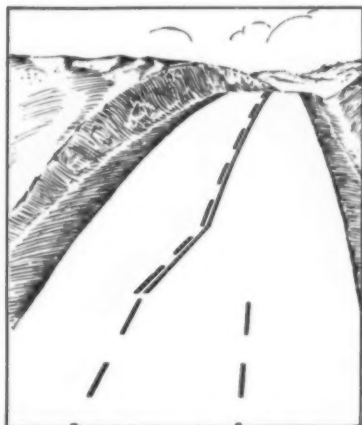
The maps are compiled from data obtained in the field surveys and from all authoritative records available. First a base map of each county is prepared, showing all highways, railroads, streams, cities and towns. In some states as many as four additional series of maps are prepared by superimposing on the base map lines and symbols showing types of highway improvement, traffic volume, bus and truck volume, school bus routes, and rural post roads. The base map with superimposed information on highway improvement, called the general highway and transportation series, is the one of greatest interest to business and the public. The remaining maps in the series are intended primarily for the use of engineers in their studies preliminary to programming road improvement and new construction.

In some of the states, certain of the maps are available to the public at a nominal sum, while other states have made no arrangements for public distribution. All inquiries about these maps should be addressed to the respective state highway department.

1940 A.R.B.A. Convention

Chicago has been selected for the location of the 1940 Convention and Road Show of the American Road Builders' Association which will be held in the International Amphitheater from January 29 to February 2. This is the first time since 1927 that a large Road Show has been held in Chicago and an attendance of 40,000 road builders is expected. The theme of the 1940 convention will be "Roads to Recovery."

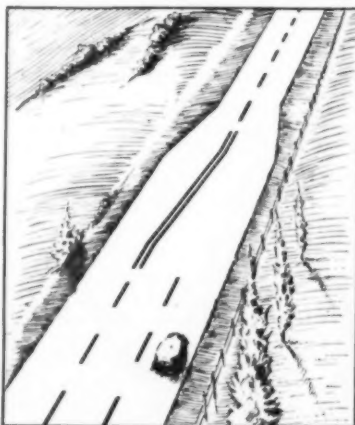
NEW STANDARD TRAFFIC-LINE MARKINGS IN NEW YORK STATE. SEE PAGE 17.



Use of Double Line on Hills



Use of Double Lines on Curves



Reduction in Pavement Widths



Markings at Intersections

The Inside of Tractors And How They Are Built

The outstanding mechanical features of the 69-hp Caterpillar diesel D7 tractor are shown in a new booklet just issued by Caterpillar Tractor Co., Peoria, Ill. Detailed pictures and diagrams show the "innards" in a remarkably interesting manner, placing particular emphasis on the 4-cylinder diesel engine that powers the machine. The tractor transmission and the parts are given a separate section of the book. Copies of this booklet, which is printed in two

colors, may be obtained free of charge by writing to Caterpillar, requesting Form 5330 and mentioning this item.

Belting Biographies

This is the title of a new 36-page booklet describing the complete line of transmission and conveyor belts made by the Mechanical Goods Division, U. S. Rubber Co., 1790 Broadway, New York City. The booklet uses a novel and interesting method of cataloging the company's belting products by showing "case histories" with illustrations of

installations, large and small, in many types of industries.

In addition, "Belting Biographies" contains much technical information, including data on the selection of the proper belt, installation, speed of operation, pulley size, tension and carrying capacity, as well as numerous types of transmission drives and conveyor layouts, together with suggestions for improving belting methods.

Copies of this booklet may be secured direct from the manufacturer by mentioning this item, or from this magazine.

Rehandling Buckets

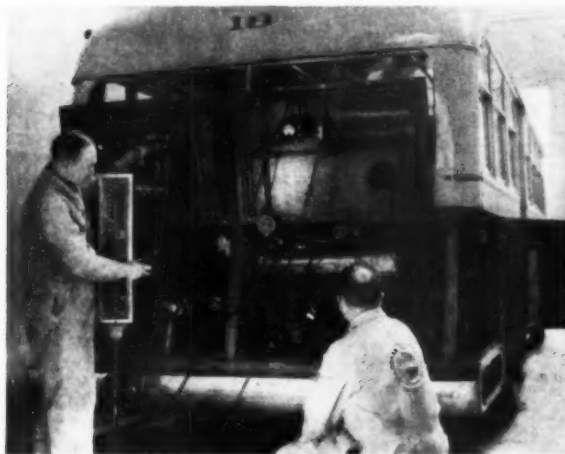
A new bulletin, No. 696, recently published by the Hayward Co., 32-36 Dey St., New York City, contains information on Hayward Class E-16 clamshells for rehandling bulk materials such as sand, gravel and crushed stone. It is fully illustrated and gives complete specifications on Hayward Class E-16 buckets of all sizes, from 1/2-cubic yard up to 4-cubic yards for rehandling both light and heavy materials. Copies may be obtained by those interested direct from the manufacturer.

GAS FUMES ELIMINATED FOR CITY COACH CO.

Complaints of gas fumes in the buses of a certain Midwestern city coach company brought a sharp ultimatum from the city health authorities. "Clean up the air in the buses or take them off the street!"

It was no time for this operator to experiment. He called in a Standard Automotive Engineer. From past experience with smoke and odor difficulties, and with his equipment for accurately checking engine performance, the engineer readily located the cause of the trouble.

Today, this coach company has the best record in its state for clean air and smokeless operation.



Smoke and odor troubles are caused primarily by poor engine performance, low manifold temperatures, poor carburetion, etc. This illustration shows some of the equipment a Standard Automotive Engineer uses to locate the real cause of smoke trouble.

STOPS BEARING FAILURES IN COUNTY HIGHWAY EQUIPMENT

Equipment in a county highway fleet was spending almost as much time in the shop as it was on the job. Bearing failures in the gear cases on trucks and tractors were keeping the maintenance gang busy. Then a Standard Automotive Engineer was given a chance to examine the bearings and the used lubricant.

He found the bearings corroded and etched. The lubricant had oxidized and formed a coating on the gear cases. Naturally the bearings were not getting proper lubrication.

The Engineer recommended the right grade of a more stable lubricant for each type of equipment. Bearing failures from this source have been entirely eliminated.



K. E. Mohold, Automotive Engineer, Kansas City, explaining the purpose of various instruments he uses to W. S. Burks, Fleet Manager of the Gillette Transportation Company.

TRUCKER HAULS 15-TON LOADS AND STILL GETS 6 TO 7 MILES PER GAL.

Engines picked up as much as 2 miles per gallon after a Standard Automotive Engineer finished checking a Kansas Transport fleet. On one of the large tractor-trailer units this meant a saving of 3 barrels of gasoline a week under normal operation. And that saving wasn't made by sacrificing power. This unit still handles loads up to 15 tons with ease.

That's where Standard Automotive Engineering Service differs. These Engineers have scientific instruments to locate the real cause of engine inefficiencies. Their instruments are portable. They can be used in your trucks on the road where the engine can be checked for both power and gasoline consumption under actual operating conditions.

Let one of these Engineers show you just what he does on one of your own trucks. You can reach him through your local Standard Oil (Indiana) office or by writing 910 South Michigan Avenue, Chicago, Illinois. It will cost you nothing but the phone call or post card.

Riding the trucks even on night runs is all a part of the Standard Automotive Engineer's job. Illustrated here are a few of the instruments that tell him what's going on inside the engine under actual operating conditions.



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STANDARD OIL COMPANY (INDIANA)
AUTOMOTIVE ENGINEERING SERVICE **LOWERS MILEAGE COSTS**



The New Armco Pipe-Arch

New Corrugated Metal Low-Headroom Pipe

Announcement of a new corrugated metal product designed for drainage service in locations where there is low clearance or low headroom has been made by Armco Culvert Manufacturers Association, Middletown, Ohio. This new Armco Pipe-Arch has remarkable hydraulic efficiency, in addition to retaining the advantages of standard corrugated metal pipe such as ease of handling, speed of installation and strength to resist impact and undermining.

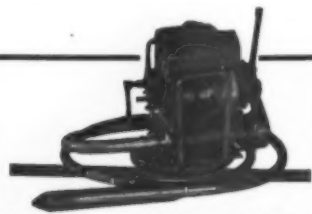
The top and bottom of the Pipe-Arch are factory-riveted into a single piece. The long sections may be fastened together with a standard coupling or connecting band of the same shape. Extensive dead-load and live-load tests show that this new pipe has strength closely comparable to that of standard corrugated pipe of equivalent span or diameter. The new product is available in spans ranging from 18 to 72 inches, with the rise being a little less than two-thirds the span. It is available in plain-galvanized or with a bituminous paved-invert.

The principal uses of the Armco Pipe-Arch are culverts under highways, railways and street intersections; storm and sanitary sewers; and conduits. Complete information on this new product may be obtained by writing to Armco Culvert Manufacturers Association, Middletown, Ohio, for the new announcement folder, "Have You Heard the Good News?"

Hydraulic Jacks

The complete line of Blackhawk hydraulic jacks in capacities from 1 to 75 tons and in hand, service and remote-control models is described briefly in catalogs issued by the Blackhawk Mfg. Co., Dept. J1869, Milwaukee, Wis. Features of these jacks include unit valve construction for dependable, quick hydraulic action; sled-type ribbed base for strength and sure footing; the release valve separate from the pump for safety; and other design features for dependability and freedom from maintenance, according to the manufacturer.

Copies of catalogs and detailed information on Blackhawk jacks may be



Concrete VIBRATORS AND GRINDERS

Write for Circular on types, sizes and prices

White Mfg. Co.
ELKHART INDIANA

secured direct from the manufacturer or from this magazine.

New Welding Truck For Field Repairs

Instant, complete, efficient welding service right on the job means less lost time, less repair expense, and no more isolated jobs. Seven years ago, R. G. LeTourneau, Inc., said to be the world's largest user of welding equipment in industry, installed the first welding truck in its service department, thus eliminating the necessity of dismantling equipment and taking it into the shop for repairs. Each year this welding truck has been refined and improved upon and has now been placed on the market.

This Tournacar Welder consists of a half-ton panel delivery truck with a four-speed transmission which will travel comfortably at passenger-car speeds and is mounted on oversize tires to enable it to get to the job in mud or snow. In the truck is mounted a Lincoln welding unit, which takes up so little room that there

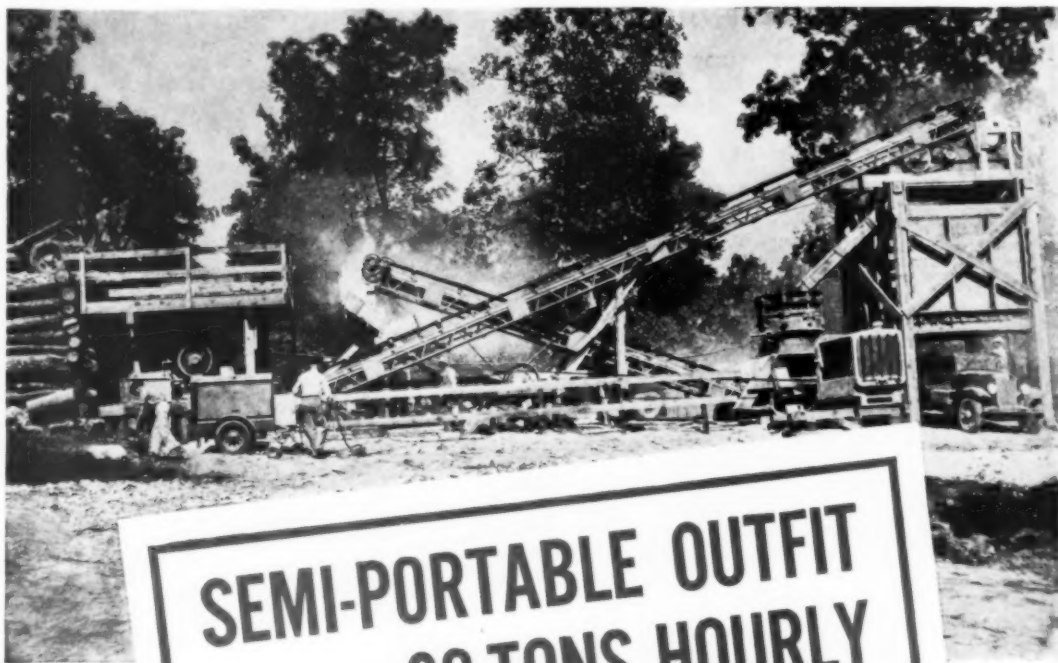


Equipment Repair in the Field with a Tournacar Welder

is plenty of space left to haul tools and extra parts for major repairs or for structural steel work. The welder is a compact 200-ampere generator with patented dual continuous amperage and voltage control providing independent regulation of arc length and heat so that adjustment can be made for any type of work or rod. Power is transmitted directly from the truck motor to the generator by a patented LeTourneau split

shaft take-off which fits directly behind the transmission and is claimed to be the only direct gear-driven power take-off of its kind.

Further information on this service truck, which is adapted for use by contractors and by state and county highway departments, may be secured direct from R. G. LeTourneau, Inc., Peoria, Ill., or Stockton, Calif., or from this magazine.



**SEMI-PORTABLE OUTFIT
CRUSHES 80 TONS HOURLY**

Here's a semi-portable quarry plant that "crushes more stone in a ten-hour shift than any other plant in North Carolina," according to Lee G. Smith, who was in charge for the owner, Nello Teer of Durham, N. C.

The plant has just finished crushing 40,000 tons of minus 1½-in. rock for a new road on Route 152, North Carolina, for the State Highway and Public Works Construction. The rock there is a very hard granite, but this sweet-running Telsmith Crushing Plant kept right on turning out its 800 tons of minus 1½-in. every ten-hour shift.

So smoothly has it operated that not once was there a mechanical failure, and no productive time was lost during the entire job. Typical Telsmith performance!

The new road extends 9½ miles between China Grove and Rockwell, small towns near Salisbury, N. C.; and is 30 ft. wide at the fills and 35 ft. wide in the cuts. All of the rock had to be minus 1½-in., with about 35 per cent minus ¾-in. material. The engineer for the state was G. H. Ehringer.

The rock was hand-loaded into skip pans. Thirteen trucks, each hauling four tons a trip, brought the skip pans to the coarse crusher, a No. 13-B Telsmith Gyra-tory Crusher. After crushing, a 24-in. x 68-ft. latticed steel frame Telsmith Portable Belt Elevator carried material direct to a 4-ft. x 10-ft. Telsmith Triple Deck Pulsator.

Oversize from this vibrating screen was chuted to the secondary crusher, a No. 36 Telsmith Gyrasphere Crusher; and a 24-in. x 38-ft. Telsmith Portable Conveyor took the re-crushed material back to the main conveyor for re-screening. A 95 hp. Diesel engine drove the entire plant. Six men took care of all maintenance and operation, including feeding the primary crusher and loading trucks from the bin.

Telsmith builds rock crushing and gravel washing plants of all sizes and types—portable, semi-portable and stationary—designed to fit your conditions and equipped for faster production, lower upkeep and more profitable operation. You'll want details... Write for free Bulletin Q-34.

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QC-3-39

TELSMITH

Safety and Economy In Roadside Program

Roadside Development Plan Requires Close Cooperation Between Construction and Landscape Engineers

By JOHN L. WRIGHT, Director of Roadside Development, Connecticut State Highway Department

(Photo on page 40)

ROADSIDE development is a comparatively new member of the highway family but evidence of its importance lies in the fact that today it is recognized as a permanent part of every comprehensive highway program. This is due largely to its contributions to the greater safety, economy, utility, and aesthetic value of the modern highway.

Prior to 1934, only a few states and counties had undertaken any extensive work of this nature. A regulation of the U. S. Bureau of Public Roads, effective July 1, 1934, made it mandatory to spend at least 1 per cent of all Federal-Aid highway allotments on roadside improvement. That ruling has had a far-reaching effect, and within a year roadside-development programs were set up in every state.

Wisely enough, in nearly every state, such work has been placed in the hands of competent trained landscape personnel. In most cases these men are attached to the maintenance or construction divisions, although in a few instances they operate through separate budgeted units.

Many phases of roadside development of a non-seasonal nature can be most economically included in a regular road-construction contract, particularly heavy grading operations which call for power equipment. It is generally considered advisable to complete by force account such seasonal items as top-soiling, seeding and planting, such work being done by men recruited from the maintenance forces or by the trained landscape crews available in some departments.

Cooperation Essential

The objectives of roadside development were aptly defined in an early report of the Joint Committee of the American Association of State Highway Officials and the Highway Research Board:

"Roadside development must conserve, enhance, and effectively display the natural beauty through which the highway passes, as well as provide maximum safety, utility, economy and recreational facilities."

These objectives can be reached only through full collaboration between the highway engineers and the landscape personnel in the preparation of the plans and specifications, and in the actual construction of highways.

The landscape engineers' recommendations for minor changes in the proposed lines and grades should receive fair consideration, as such slight changes frequently result in increasing or preserving the natural scenic beauty. They

often aid in lowering the future cost of landscape operations and roadside maintenance. The construction of highways in rural areas inevitably necessitates the removal of large quantities of fertile top-soil and native trees and shrubs. Construction engineers should conserve these materials as requested by the landscape men. The top soil should be stacked on the roadsides, out of the way of construction, where it will be easily available for future roadside improvements. In addition, they should see that the trees and shrubs marked for salvaging are carefully removed from the path of construction.

The economic value of conservation in highway activities is clearly realized, and full cooperation between the various agencies is essential to its success.



Mill Plain Rest on U. S. 6 Near Danbury, One of the Picnic Areas Provided Along the Roadsides by the Connecticut State Highway Department

It is gratifying to note that highway engineers are rapidly becoming "landscape conscious." Evidence of the influence of landscape engineering principles on the design of our modern streamlined highways is found in their easy pleasing curves and flattened well-

rounded slopes. The windrows of top soil, which the engineers have saved along nearly every construction project, and the innumerable temporary nurseries replete with native trees and shrubs salvaged from the path of construction

(Concluded on page 36)



WHAT USERS SAY

"Places material just where you want it".
—A NEW YORK COUNTY HIGHWAY Supt.

"You don't have to go back over your work".
—A GEORGIA COUNTY ENGINEER.

"A time saver and it stops loss of materials".
—A CANADIAN CONSTRUCTION CO.

"Regulates Accurately from 1 1/2" right down to a spray".
—A CITY DEPT. OF PUBLIC WORKS.

"Saves Half the pay roll".
—A MISSOURI CONTRACTING COMPANY.

QUOTED STATEMENTS are authentic. We retain in our files the original reports received from users for record and proof of quotations used in our advertising.

The marked saving in time, labor and material that can be yours, has been profitably proved on thousands of jobs by the owners of more than five hundred Buckeye Surface Material Spreaders now in use.

JOBS MOVE FASTER. You can complete more miles, and in less time, because you spread material accurately to specifications.

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NO MATERIAL WASTED. None is scattered where it is not wanted. No material is lost in roadside piles.

This three-way saving soon pays for a Buckeye Spreader. Prove it on your next road surfacing job. Get the facts on all its advantages.

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Be sure it's the

GIANTGRIP
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Either Steel or Aluminum

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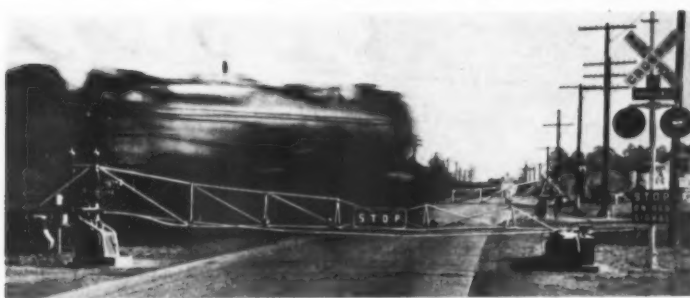
Two useable edges—one sharp-cornered and squared for scraping; the other rounded for line-point straightedging.

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Highway Guardian Automatic Crossing Gates Protect a Railroad Crossing at Pocomoke, Maryland

R.R. Crossing Guard Has Hydraulic Snubber

Two installations of a new automatic crossing guard have recently been completed at Middletown, Del., at a crossing of U. S. 13 and the Pennsylvania Railroad, and at Pocomoke, Md., on U. S. 13 where it crosses the Delmar Division of the Pennsylvania. The new gate, called the Highway Guardian, is of skeleton steel work built as an arc with the concave side facing approaching highway traffic. Across the frame are two strong cables stretched like the strings of a bow.

The end of the gate when lowered fits over a post on a snubber consisting of an hydraulic cylinder. A car striking the gate is snubbed by the cables, slowing it up, and the hydraulic snubber at the end of the gate finishes the job, bringing it gently to a full stop.

The manufacturer, Atlantic Steel Castings Co., Chester, Pa., reports that officials of the respective state highway departments have tested the gate with cars at 50 miles an hour and while the front fenders and radiator grill may be bent, the machine will be stopped without serious damage to the car or injury to the occupants.

The gates are designed to be fully automatic. Approaching trains lower the gates and turn on flashing red lights set in the gates. If an automobile is caught between the gates, it can continue, pushing the far gate back without damage. At night red lights on the road arms, standard flashing lights and floodlights operated by the train give ample warning. It is reported that ten crossings can be protected by the Highway Guardian for about the average cost of one crossing elimination.

New Concrete Plant Is Readily Portable

The single unit Strayer portable concrete mixing plant delivers up to 32 cubic yards of concrete per hour, loads and stores the aggregate, batches and mixes the concrete. This new plant, made by Erie Steel Construction Co., Erie, Pa., is a complete portable mixing plant 8 feet wide x 12 feet 6 inches high x 28 feet 7 3/4 inches long in transit and consists of a bucket elevator of the vertical fully enclosed type having a capacity of 60 tons per hour when fed continuously. It delivers to a two or three-compartment bin having a heaped capacity of 20 cubic yards divided in the ratio of two to three. The bin has vertical sides, ends and partition substantially hinged so that they can be turned down to meet highway clearances.

The Erie weighing AggreMeter in the plant is equipped with a 3,500-pound two or three-beam scale with a gravity over-and-under dial. The charging gates are of the roller-operated type and the discharge gate is of the radial type, foot-operated. The cement hopper, either for bag or bulk, has a capacity of 5 cubic feet with a discharge gate of special design to prevent jamming, and is equipped with a power-driven screw conveyor, positive in action.

The mixer is a drum-type unit of standard manufacture and will handle up to a 5-bag batch of 1:2:3 1/2 mix. It

is equipped with a charging hopper and manually operated discharge gate. The water regulator is calibrated in both pounds and gallons. The power unit for operating the elevator and mixer is a 32-hp 4-cylinder 1,200-rpm gas engine. When preparing to move, the engine drives a hoist which pivots the elevator. The truck frame of the plant is of welded design with gooseneck construction, per-

mitting a turning radius of 14 feet. It has a wheelbase of 13 feet 11 1/8 inches and an overall length of 17 feet without the drawbar. The rear running gear consists of one axle with two wheels and the front gear has a rocking-type axle also with two wheels, all equipped with two 7.50 x 15-inch 10-ply tires. Mechanical-type hand-operated rear-wheel brakes are installed and actuated from the operator's platform.

A complete description of the Strayer portable concrete mixing plant is found in Bulletin SCP No. 1-39, which will be sent free on request by the manufacturer to those mentioning this item.

Concrete Made Watertight

The subject of waterproofed concrete is of general interest because of the many jobs where it is necessary to make concrete watertight above and below grade. A new 36-page book has just been published by the Medusa Portland Cement Co., 1000 Midland Bldg., Cleveland, Ohio, entitled "How To Make

Good Waterproofed Concrete." This book tells why concrete, stucco, masonry and mortar should be waterproofed during original construction and explains the essentials of good waterproofed concrete and the advantages of waterproofed cement in making concrete for both above and below grade construction. Copies may be secured free by writing on your company or official letterhead.

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GET A LOAD OF THIS!

Big Capacity Universal-Lorain Truck Crane Sets 25 to 60 Tons of Steel Daily with 95-Ft. Boom

High and heavy lifts mean little to this big capacity Universal-Lorain of the Diamond Steel Construction Co., Youngstown, Ohio. Equipped with a 95-ft. boom, the unit set 25 to 60 tons of steel daily for this building addition, and handled loads up to 12,800 lbs. at 22 ft. radius.

The big capacity Universal-Lorain offers a perfect combination of features for steel erecting or any heavy-duty crane service. Its Balanced Center Drive design produces big capacities at minimum weight. The all-welded boom is designed for easy assembly by means of pin connections

and may be extended up to 100 ft. by addition of center sections and tip extension. And a steel erector's precision boom hoist with power-controlled lowering gives the operator complete command of boom and load at all times.

Universal-Lorain introduced the first practical truck cranes 20 years ago and has kept them practical ever since through modern design and construction. That's why you can select Universal-Lorains secure in the knowledge that they will serve you better—longer.

Write today for catalog.

UNIVERSAL CRANE DIVISION
THE THEW SHOVEL COMPANY
LORAIN, OHIO



UNIVERSAL LORAIN
TRUCK CRANES & SHOVELS
A Capacity and Type For Every Job

Scientific Research on Precast Concrete Units

The Cemenstone Corp. of Pittsburgh, Penna., has established an industrial fellowship in the Mellon Institute for conducting fundamental chemical and physical research on precast concrete units such as are being produced by new principles of manufacture by the donor company. The main objective of the investigational project will be to develop novel practical methods and techniques that will have wide applicability in the production of precast concrete.

Donald R. MacPherson, for the past 5 years a member of the research staff of

the Portland Cement Association, has been appointed to this fellowship. Mr. MacPherson was formerly concrete specialist with the engineering department of the City of Seattle, and later was with the Washington State Highway Department where he was engaged in the investigation of highway materials.

With the establishment of this fellowship, the Cemenstone Corp. has announced a program for the nation-wide standardization of precast concrete shapes as to size, appearance, durability, and strength. W. P. Witherow, founder of the Witherow Steel Corp. and President of the Blaw-Knox Co., is Chairman of the Cemenstone Board; Leslie M.

Johnston, formerly Vice President and General Manager of the A. M. Byers Co., is President of the new organization; and Albert Henderson, who evolved the Cemenstone system, will serve as Consulting Engineer.

Picking the Right Tires For Trucks and Tractors

An operator's handbook containing valuable information on truck, bus, trailer, tractor and implement tires has recently been issued by The B. F. Goodrich Co., Akron, Ohio, and is available to readers of this magazine free on request. The booklet contains 96 pages of

valuable information on the inflation of tires, character of tires, sizes and treads.

New Crusher Catalog

A new catalog featuring Telsmith Gyrasphere crushers for secondary crushing has just been issued by the Smith Engineering Works, 4014 No. Holton St., Milwaukee, Wis. The features of this crusher are described and illustrated and complete specifications are included.

Copies of this Bulletin No. 263E may be secured by those interested direct from the manufacturer or from CONTRACTORS AND ENGINEERS MONTHLY.

ALL ROAD-JOBS LEAD TO

"CATERPILLAR" DIESELS!



Inexpensive surfacing material—with "Caterpillar" Diesel Power! Dodge County, Wisconsin, owns this Pioneer crushing-plant driven by a "Caterpillar" Diesel D13000 Engine. Operating 10 hours a day, this "Caterpillar" Diesel uses only 3½ gallons of 8-cent fuel an hour . . . turns out 60 yards of material an hour . . . saves \$10 a day over the power formerly used by Dodge County for this same work!

THE NEW "CATERPILLAR" No. 112 MOTOR GRADER

A new motor grader, introduced just about two months ago, which offers all the blade-positions of the "Caterpillar" Diesel No. 12 Motor Grader—the strongest, fastest operating, most versatile of all motor graders! With the new No. 112, you have a blade-lift of 15 inches above the ground. Side-shift is 3 feet (blade can extend 6 feet, 5 inches beyond the line of the wheels). Maximum bank-cutting angle is 90 degrees.

And the blade can be turned completely around for working in reverse.

The No. 112 Motor Grader makes ditch cuts . . . high-bank cuts . . . flat-bottom ditch cuts . . . low-bank cuts. It blades, scarifies, clears snow, handles a roller. It is offered with tandem or single drive, four forward speeds, and a gasoline or Diesel engine. The photograph shows it at work on a widening and regrading job in Georgia.



A "Caterpillar" Diesel D8 Tractor and a "Caterpillar" No. 48 Elevating Grader—one of two outfits like this owned by Ward County, North Dakota. A high road, such as is being cast in, has two outstanding advantages. The winds keep it clear of snow in winter, and it drains quickly in the spring. If you're building such a road, here's the equipment to do it! On jobs suited to its use, it is the fastest direct-

move of them all. In the nine months before this picture was taken, Ward County built 47 miles of road with its two outfits. The tractor uses only 4 gallons of low-cost fuel an hour.

Other county road-jobs, done quickly and economically with a "Caterpillar" Diesel Tractor, include bulldozing . . . supply hauling . . . snow removal . . . and pulling grader and pug-mills.

NO MATTER how you look at any angle of road-building or maintenance, everything about every job seems to point in the direction of "Caterpillar" Diesel Equipment!

When you're considering the *time-element*, for example, you'll wind-up with a choice of "Caterpillar" Diesels because of their outstanding work-capacity. When it comes to putting *real quality* into the work, you'll swing to "Caterpillar" Diesels, again, because of their job efficiency. And questions of *cost* will add another vote for "Caterpillar" Diesels because of their small consumption of low-cost fuel—and their freedom from excessive replacements and repairs!

Those are important advantages, of course. But there's still another advantage that's just as important—if not more so. It's the *versatility* of "Caterpillar" Diesel Equipment.

None of these machines is built for a single job. Instead, each can handle a number of widely different operations. And that saves you from buying and maintaining a fleet of "specialists" which have to stand idle a great deal of the time! See your "Caterpillar" dealer, or write direct for more information. **CATERPILLAR TRACTOR CO., PEORIA, ILL.**

CATERPILLAR

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

**16% FASTER
FROM PLANT TO JOB!**

GM DIESEL
Case History
D-74
User: Maloney Concrete Company, Inc.,
Washington, D. C.
Installation: GM Diesel, 3-cyl. engine
replaces 331 cu. in. gasoline motor
on 1936 truck.
Performance: 16% time saving on regu-
lar run, between plant and job.

**—this Diesel adds a concrete
profit to the savings it makes**

ALL concrete is pretty much the same, and today's rock-bottom prices have practically eliminated the cost factor from competition.

That's where fast deliveries come in—get the *re-orders*.

And that's another way the GM Diesel is outperforming engines of previous design—gasoline engines included.

Just watch it highball through sand or mud—take the hills in higher gear—pick up with a snap out of hairpin bends—lug crushing loads through blister-

ing heat with a miser's share of lube oil!

This same tank-like pulling power of the Dean of the Diesels is available for everything on construction jobs—on shovels, cranes, draglines, bulldozers and mixers. It responds to variable loads with a snap and alertness even gasoline engines can't match—yet "hangs on" with the tenacity of a steam engine.

Ruggedly built on the General Motors 2-cycle principle, its operation is simplified beyond need for

"expert" operators—its resistance to wear vitally increased.

And all its wearing parts are standardized for quick, low-cost replacement. That completes the picture of Packaged Power, from 15 hp. up, ready to go—on all kinds of stationary and portable work.

The GM Diesel dealer near you can show you how, why, when, and where it will fit in on your jobs.

Write or wire for his name and address.

DIESEL ENGINE DIVISION
General Motors Sales Corporation, Cleveland, O.



★ **GENERAL MOTORS DIESEL** ★

SEE THE GENERAL MOTORS DIESEL EXHIBITS AT THE NEW YORK AND SAN FRANCISCO FAIRS

Preparing Gravel For Texas Road Job

H. B. Zachry Co. Sets Up Complete Screening And Crushing Plant for Job North of Austin

(Photo on page 1)

TO provide a better approach to the capital city of Texas from the north, U. S. 81 has been widened from an old 20-foot bituminous-macadam surface for 3.45 miles from the city limits of Austin, creating two 22-foot traffic lanes and a 16-foot esplanade on a somewhat restricted right-of-way. The new pavement is a 2-inch asphaltic-concrete surface on a 10-inch flexible crushed-limestone base. Space for parking is provided by a 9-foot strip on the outside of each lane with a rolling curb.

All aggregate for the job was processed at the site in a complete plant installed by H. B. Zachry Co. The aggregates were taken from the Colorado River of Texas within the city limits of Austin by a commercial producer, hauled 7 miles by Zachry, using six trucks, and stockpiled ahead of the paving in a large vacant lot.

Screening and Crushing Plant

The run-of-the-river material was moved from the stockpiles with a Bucyrus-Erie 34B crane with a 45-foot boom and a 1 1/4-yard Williams clam-shell bucket. This same crane was used to handle the finished aggregate from the sized stockpiles to the Johnson weighing batchers. The raw material was delivered to an 8-foot square hopper from which it was fed uniformly to a 24-inch belt conveyor 40 feet long by a Smith Engineering Works reciprocating feeder. The belt dropped the material into a 48-inch x 14-foot home-made rotary drier which had a Gem burner using 250 gallons of fuel oil per day for drying the aggregates.

From the drier the aggregates went to a 9 x 36 Cedar Rapids jaw crusher driven by a 160-hp LeRoi engine which also drove all the rest of the plant except the roll crusher which was driven by a 120-hp Waukesha motor. The material from the jaw crusher was carried beneath the roll crusher on a 15-foot belt to a bucket elevator which raised it to the 36-inch x 16-foot Pioneer double-deck wire shaker screen. The top deck carried one screen to remove 7/16-inch material and larger while the bottom deck had 12 feet of 10-mesh and 4 feet of 5/16-inch screen. The oversize was returned to the Pioneer double roll crusher and thence to the 15-foot belt mentioned above. The use of this belt running beneath the roll crusher for both crusher-run materials was a great saving in space and power.

The screened material went to two bins, one of which had two compartments for the 5/16-inch and 10-mesh material. The material was hauled out from the bins by a single truck working constantly and stockpiling ready for the batching plant. A novel feature of the

home-made drier was that the entire frame was made of pipe welded on the job.

Auxiliary Equipment

A Schramm portable compressor run alongside the crushing and screening plant supplied air for the fuel burners while a hand pump from drums of fuel oil or gasoline raised the fuel to gravity tanks mounted on a frame beside the plant. A single large tank near the top of the plant carried the fuel oil for the drier and a smaller one below held the gasoline for both engines.

A portable acetylene generator and Oxweld torches as well as a Lincoln portable electric welder were in constant use at the plant and shops of the contractor for repairs and the strengthening



C. & E. M. Photo
The Welded Pipe Frame Supporting the Drier, with a LeRoi Engine for Driving the Jaw Crusher in the Background

of various pieces of equipment subjected to unusual service. These were

used in the construction of the frame for the drier.

Personnel

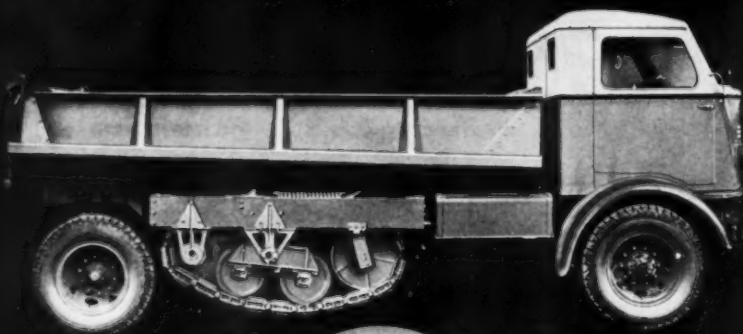
The contract for the base course and surface for this job was awarded jointly to H. B. Zachry Co. of Laredo, Texas, and the Texas Bitulithic Co. of Dallas, Texas. D. R. Ward was Job Superintendent and W. D. Tiner, General Superintendent for all Zachry contracts. Ernest Rogers was Superintendent of the aggregate plant. For the Texas Highway Department H. E. M. Stevenson was Resident Engineer.

New Alemite Adv. Mgr.

Announcement has been made by the Stewart-Warner Corp., Chicago, Ill., of the appointment of C. W. "Ted" Grange as Advertising Manager of the Alemite Division. Mr. Grange, who left the International Research Corp., where he has been regional sales manager, to join the Stewart-Warner organization, will be assisted by L. R. Light.

A N N O U N C I N G

The New LINN C-5



12
M. P. H.
ON FLEXIBLE
LINN TRACKS



35
M. P. H.
ON WHEELS



THE GREATEST ADVANCE IN HAULING IN A GENERATION

Here's the most flexible profitable vehicle ever developed for hauling. Merely by pushing a lever at the driver's position, it is instantly converted from truck to tractor... or vice versa.

If the job is over tough footing... through muck, over ice, or up steep grades... the C-5 operates on LINN flexible tracks, carrying its own payload at speeds up to 12 M.P.H. If the hauling is over good roads, it operates on dual pneumatics all around and at speeds up to 35 M.P.H.

However, if the job combines both conditions, the C-5 completes the job unaided... without auxiliary equipment... without shifting the load! It comes up out of

the pit or through the muck on its own tracks; then, when it reaches good roads, it rolls away at high speed on rubber.

Thus the LINN C-5 will operate efficiently anywhere, at any time, on any kind of job. Flexible, fast, light in overall weight, and relatively inexpensive, it is a real time and money saver for road building and maintenance, contracting, snow plowing, log hauling, and industrial haulage needs. You will want all the facts on this proved haulage unit. Phone the nearest LINN representative, or, write direct to Morris, N. Y.

Where haulage is to be over good roads for any protracted period, the traction unit is readily detached and stored. Sold with or without the traction unit.

**DON'T
STEP
ON A
NAIL**

Use Williams Water Supports
Instead

And incidentally our High Tensile
Clamps and Ties are the Best Safety Insurance

Williams Form Engineering Corp.
Box 925, Madison Square Sta.
Phone 3-3823 Grand Rapids, Mich.



THE LINN MANUFACTURING CORPORATION
MORRIS, N. Y. Represented in Principal Cities BUFFALO, N. Y.

Crawler Wagons Used On Levee Enlargement

(Continued from page 1)

K tractor with a Baker bulldozer was used for grading the top aided by an International TD-40 with a Bucyrus-Erie bulldozer.

For hauling fuel 4 miles from the nearest railroad station a Ford truck with a 500-gallon fuel oil tank was used, frequently aided by one of the tractors because of the condition of the levee road due to heavy rains. A P & H-Hansen welder was maintained in camp for the various repairs to equipment.

Working two 11-hour shifts daily the contractor was able to move an average of 2,400 yards a day with a maximum of 4,000 yards. The haul from the pit across the old pits and including the distance hauled to get to the cross-overs was between 800 and 900 feet. Excluding the abundance of rainy days that occurred at the beginning of the work, the contractor hauled 66,000 yards in 4 weeks.

Miscellaneous Equipment

A complete lubricating outfit was maintained at the field shop and the tractors and wagons greased on a regular schedule. Starting early in the morning, one tractor and wagon were pulled out of the line and greased and then the routine was repeated at six in the evening. One grease man and a helper did all the greasing of the hauling equipment and the oiler on the dragline handled that. One phase of lubrication not met with frequently in this type of work was the regular oiling of the inside of the crawler-wagon bodies so that the sticky gumbo would slide through without assistance. Diesel fuel was used for this purpose.

Three 1,500-watt Kohler lighting plants were used on the job, one for the camp and another mounted on a skid to supply current for the floodlights for night work, and the third at the grease house.

A bulldozer graded the levee during the enlargement while a grader was used for the final dressing.

Personnel

Lytle Brown, Jr., was Superintendent for L. O. Brayton Construction Co. on this contract which was done for the Second New Orleans District, U. S. Engineer Department, Lieut.-Col. William F. Tompkins, District Engineer. J. W. Martin was Inspector for the U. S. E. D.

Manganese Steel Catalog

A new 64-page catalog with over 400 illustrations showing manganese steel castings for all types of equipment, the parts of which are exposed to impact and abrasion, has just been issued by the American Manganese Steel Division.

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Hauling Out a Load from One of the Borrow Pits on a Crossing Over the Old Pits

Chicago Heights, Ill.

An introductory section asks the question, "What is manganese steel?" and then answers it, covering its origin, physical properties, and why it resists impact and abrasion. Other information on the company's plant and research facilities, the method of manufacture, and the many uses of manganese steel is included.

Copies of this new catalog may be secured direct from the manufacturer.

Beauty and Efficiency

In an address at the dinner at which the Awards for the most beautiful steel bridges built during 1938 were announced, F. H. Frankland, Chief Engineer, American Institute of Steel Construction, said:

"The beauty of a bridge to a great extent comes from balance of its form and the symmetry of its lines. Many bridges of splendid line and proportion

have been camouflaged with incidental decoration which has achieved nothing except the partial and irritating obliteration of the beauty inherent in the simple dignified lines of a well-balanced structure.

"It is instructive to note that considerations of efficiency and economy of fabrication and erection have worked toward simple functional forms and assemblies. This trend is particularly noticeable in the more important bridges designed within the past year or so, and it is apparent in the elimination of much latticing and unnecessary cross bracing, and the substitute thereof of solid member, plate and box sections. These substitutions are invariably the most efficient as to stress distribution, to fabrication and erection and to maintenance.

"Thus the trend is to utilize our developing knowledge of design toward a goal of true functionalism. With this trend the obvious possibilities of improvement in appearance should easily be seen and utilized by the up-to-date bridge engineer."

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● On this road job in south central Kansas — Stamey & Tidd, Contractors — the Gardner-Denver UMB Wagon Drill and Portable Air Compressor shown in photograph have moved nearly 80,000 yards of gypsum rock, working on 24-hour service. The compressor has operated the entire time without a forced shutdown, and with no replacement parts needed. The UMB drill has needed

replacement only of a broken exhaust control valve spring. "We're pleased," says Mr. Stamey, who is in charge of the job, adding that he also uses Gardner-Denver S-35 Sinking Drills for block-holing.

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80th
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The Jacobsen Motor Scythe

New Highway Mower For Boulevard Strips

A new motor scythe, particularly designed for mowing boulevard strips on divided highways, along ditches, hill-sides and other places inaccessible to a power mower, has been announced by the Jacobsen Mfg. Co., Racine, Wis., manufacturer of power mowers.

Equipped with a 4-foot sickle bar and powered by a specially-built 2-hp Jacobsen engine, the mower has a capacity equal to seven men with hand scythes and will cut through the tallest grass and toughest weeds, according to the manufacturer. It is a light yet sturdy well-balanced machine, with an auto-type differential and separate sickle and traction clutches. It cuts as low as 1½ inches and as high as 5½ inches.

Literature with detailed specifications on this new Jacobsen motor scythe may be secured by interested state and county highway engineers direct from the manufacturer or from this magazine.

Roller Improvements

Two new improvements in the Hercules Ironeroll road roller have recently been announced by the Hercules Co., Marion, Ohio. The old-style level reversing gear for transmitting the forward and reverse movement of the roller has been replaced by spiral tooth gears which give smoother, quieter and longer operation. The gears are of alloy steel, with cut teeth, and heat treated. The result of using these spiral gears is increased rolling hours and more efficient operation with a marked reduction in maintenance cost, according to the manufacturer.

Another improvement incorporated in these rollers is the hinging of the engine hood. Formerly the hood was made in one piece and was quite difficult for one man to remove. The hood is now di-

vided and hinged similar to automotive types and can be raised from either side of the roller by one man. This feature materially increases accessibility to the motor for necessary adjustments.

A new bulletin, No. H-3910, just issued as a supplement to the Hercules general catalog No. H-3801, describes these new improvements in the Ironeroll roller as well as its other features. Copies of either or both of these catalogs may be secured direct from the manufacturer by mentioning this magazine.

Portable Power Tools

Mall portable electric saws in various sizes, door planes and door mortisers are completely described and illustrated in a new bulletin, Form 162, recently issued by the Mall Tool Co., 7743 So. Chicago Ave., Chicago, Ill. Copies of this bulletin, which also contain prices and specifications, may be secured direct from the manufacturer, or from this magazine.

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Swing Span Replaces Old Bridge Over Canal

(Continued from page 2)

taining wall 1 foot 3 inches thick built on an arc of 68-foot radius concaved toward the canal and 10 feet high. This retaining wall carries the 12-inch approach slab of the structure. In front of the wall on the canal side are two concrete columns 5 feet 1 11/16 inches high and 2 feet 6 inches x 2 feet 3 inches in cross section to carry the wedging device for the swing span.

Pier 2 on the south bank consists of two columns on 16-foot centers on separate footings 6 feet 6 inches x 10 feet and 3 feet deep. The two columns are 4 feet square and measure 13 feet 7 11/16 inches from the top of the footing to the cap. The columns are tied at the top with a reinforced concrete beam and the cap. There are eight 48-foot untreated timber piles supporting each pedestal in the pier and the piles extend 24 inches into the footing, with a mat of 1-inch square bars and 3/4-inch round hoop bars top and bottom. The tie beam is 3 feet deep x 2 feet thick and extends upward at an angle of 45 degrees at the end to support the end of the cap. The cap is 2 feet 6 inches deep and 6 feet 6 inches wide and 27 feet long and carries the riser wall which is 3 feet 2 inches deep, 15 inches wide and 26 feet long and also supports the approach span.

Each of the Piers 1, 2 and 4 were built by the same method with a 1-inch to the foot batter in the foundation pile on the canal side. On Pier 1 the excavation was done in the open with no sheeting. Pier 4 required wood sheet piling. The derrick and mixer were moved to the east side for pouring Piers 1 and 2. This latter pier carries the approach span on the riser and the end of the turn span carried on a cast iron casting carried by the cap.

Erecting the Swing Span

The main swing span was erected on falsework piling driven into the north shore of the canal and consists of two main plate girders on the outside with three lines of intermediate floor stringers continuous over two 21-foot 8-inch panels. The span was erected with a camber of 1 3/4 inches. The main girders are 6 feet 5 inches high at the center, tapering to 3 feet 1/2 inch at the end of the girders and were delivered in three sections and field-spliced by riveting, using a 5 x 5 portable Ingersoll-Rand compressor to operate the riveting machines. The intermediate I-beam stringers which are 18 inches high run for two panels and then are butted without connections to each other. All of the steel work was erected with a stiffleg derrick operated by a Lidgerwood steam hoist.

The end floor beams are 103-pound I-beams 21 inches high and the inter-

mediate floor beams are 27-inch 91-pound beams with the main center girder over the center bearing being built up with heavier plates and stiffening angles to carry the load to the 18-inch bronze disc bearing which moves on a hardened steel disc mounted on the center casting and this on the central column of the

pier. The pivot pier carries a rack for only 144 degrees as the bridge is built to turn only 90 degrees instead of a full swing as in the case of many swing spans. The weight of the span is carried solely on the center bearing but the span is provided with four balance wheels which travel in a circle with a 10-foot

radius pivoted about the center casting while the span is in motion.

Concreting

The forms for the piers were all built up of 3/4-inch face lumber tongue and groove with 2 x 4 studs on 20-inch cen-

(Concluded on page 27)

briefly describe your
hauling
problem—



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108 Orchard Street • ALBION, PA.

we'll show you a proven
GUARANTEED unit
that will solve it
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"Job Test" Evidence Proves A-W Scraper Superiority

"The Answer to a Road Constructor's Dream"

... Says J. P. McKee, Commissioner of District No. 2, Leroy, Ala. He adds: "Since purchasing the A-W 5-yard Scraper I have found that I have been able to move more yards of dirt per day than by any other method ... with a lowering of operating expenses. These operating figures prove it:

Average length of haul—1 way	500 feet
Number of hours operated each day	8 hours
Number of trips per day	60
Times per trip	6 minutes
Total cubic yards per day	400
Kind of tractor used for power	T-40
Amount of fuel used per day	15 gallons
Cost of fuel per gallon	cents 8 1/2
Repair and maintenance cost per month	none thus far

● Accurate records of scraper performance in all parts of the country pile up evidence that A-W 5, 6 and 8-yard Tractor Scrapers load more dirt per tractor horsepower ... dump and spread with greater speed and accuracy ... than any other scraper of the same capacity. Bit can be raised or lowered with trigger-quick accuracy. Pan fills rapidly and cutting edge is always steady because rear wheels track *inside* of bit on smoother ground. Side sway on slopes or rough terrain is minimized and draft lightened because weight is distributed over six tires. Time is saved by the ability of these scrapers to handle capacity loads in rough going ... to dump near the edge of a sharp drop without stopping or backing up. Write for complete details and performance records on your type of work and soil. The Austin-Western Road Machinery Company, Aurora, Illinois.



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Tar Stabilization On County Roads

Program of Low-Cost Road Construction, Using Tar To Stabilize Gravel and Stone, in Indiana

By RALPH WITT, Road Supervisor, St. Joseph County, Indiana

† ALL county highway engineers are interested in developing a secondary-road type which will stand a reasonable amount of heavy traffic and yet not cost so much as to keep it out of the reach of counties with limited budgets. With this aim of low-cost roads in mind, we have carried on some experimental road construction, using tar as the road-building material.

Early in 1938 we developed a program and bought enough tar to construct 4 miles of road. Three roads in different localities were selected to represent, as nearly as possible, a cross section of the highways in St. Joseph County. Of the roads selected, all of which are heavily traveled, one has a very heavy clay base, another sand, another muck and clay, and another sand and clay.

The Road-Mixed Base

One road had just been completed before the tar treatment and on this road 4 inches of gravel and clay was spread over the width of the road. On the other roads no new material was added. The first step in the operation was to scarify the road to a depth of 4 to 6 inches. This scarified material was windrowed and turned until pulverized. Then the material was split into two windrows for more efficient mixing. One windrow was spread out wide enough to receive an application of about 0.3 gallon of tar per square yard. This was bladed and mixed and an additional shot of about 0.2 gallon was applied. After a thorough blading, this was laid out and the second windrow treated in the same manner. The base was then compacted with a 10-ton 3-wheel roller, followed by a multiple-blade maintainer, resulting in about 6 inches of compacted material. Immediately after rolling, a tack or light seal coat was applied and covered with pea gravel. Later a seal coat was applied, consisting of about 0.3 gallon per square yard and all the pea gravel the tar would incorporate. The road was then finished and in one operation we built a road adequate for any except the most excessive traffic conditions. At no time was it necessary to close the road. It must also be kept in mind that this processed base is ready for any of the standard types of bituminous surfaces.

Costs

The short period of time required to build these "tar-processed base roads" makes them very economical. Our experience indicates that a mile of road can easily be completed in five working days or less. This saving in time is quite as important as the low cost per mile. The materials cost, in place, per mile of base processing and seal was \$1,550 for the finished road. It cost \$1,390 per mile to process the base to a depth of 4 to 6 inches, exclusive of the seal coat. The rate of application and cost per mile are, of course, governed by local conditions, climate, topography and soil.

On the roads thus constructed, we used 55,427 gallons of TM-2 and 15,014 gallons of TH on an estimated total of 51,981 square yards of road surface. We used a trifle over 4,000 gallons of TM-2 as a base treatment for 1/2 mile of road on which we spread a course of asphaltic road-oil mix.

Equipment Used

After the first mile, we decided that three power graders, a multiple blade maintainer and a roller were all the equipment needed to build this type of road. At least one of the power graders should be equipped with a windrow eliminator.

Results

To date these roads have shown no failures and, with one exception, are holding up much better than expected. One road was not sealed or tack-coated for some time after the treatment and this road has one bad spot which will have to be repaired. The roads have a hard, smooth non-skid surface and seem to be the answer to construction and maintenance problems on our secondary roads.

From a paper presented at the Twenty-Fifth Annual Purdue Road School.

If you have any special lubrication problems, write the Editor. He will be glad to help you.

Double-Acting Hammers And Pile Extractors

Data on McKiernan-Terry pile hammers and pile extractors, including specifications, dimensions, parts lists, lubrication information and pile driving formulae are contained in Bulletin 52, recently issued by the McKiernan-Terry Corp., 19 Park Row, New York City. These hammers and extractors are built

with heavy rams delivering powerful low-velocity blows at high frequency and have special features of design and construction to provide long life and low maintenance cost, according to the manufacturer.

Copies of this bulletin, which also contains descriptive matter covering pile-driving leads, hammer accessories, attachments and fittings, may be secured direct from McKiernan-Terry Corp.

RAIL CRANES SHOVELS DRAGLINES ZEE ROTATORS	<h1>BROWNING</h1> <p>has had no peer for 40 years</p> <p>← AT YOUR SERVICE → FOR THESE PRODUCTS</p> <p>THE BROWNING CRANE & SHOVEL CO. Established 1899</p> <p>Main Office and Factory: 16228 Waterloo Rd., Cleveland, Ohio Export Department: 35 Church St., New York, U.S.A.</p>	CRAWLER, TRUCK AND WAGON DRAGLINES SHOVELS CRANES - HOES
BROWNING PRODUCTS		BROWNING PRODUCTS
DIESEL GASOLINE STEAM ELECTRIC		DIESEL GASOLINE STEAM ELECTRIC

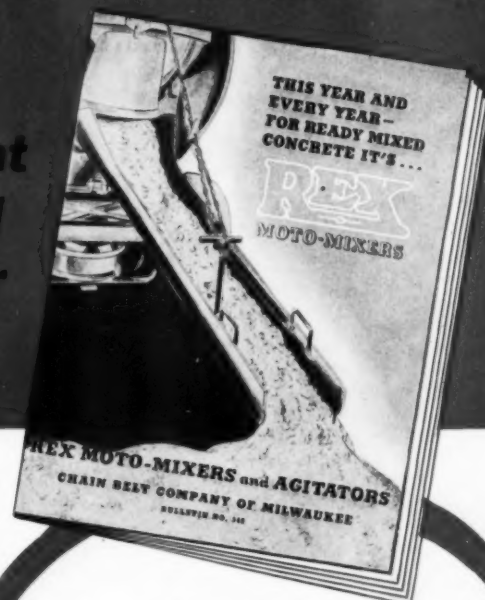
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Here's the latest, most complete information on the design, construction and use of Rex Moto-Mixers and Agitators—a 48-page book which tells, without mincing words, why Rex Moto-Mixers of all the truck mixers on the market are the ones to use on your concrete jobs—or to sell sand, stone, cement and gravel as ready mix.

Frankly, we've never seen another like it. Not a catalog—it's a "photolog"—using large, detailed photographs to illustrate each point—leaving nothing to your imagination. We believe you'll find it the most easily read and most convincing piece of truck mixer literature you have ever seen. Whether you have one truck mixer or ten, or have yet to buy your first—you'll find this book a real help to you in getting the low-down on the last word in truck mixer design!



LOOK AT THIS PARTIAL TABLE OF CONTENTS!

The Rex Roll Call of great jobs and money-making fleets... How they're built... Why they're easier to operate... Challenging comparison... Complete and detailed specifications... Moto-Mixers make money on jobs of all types.

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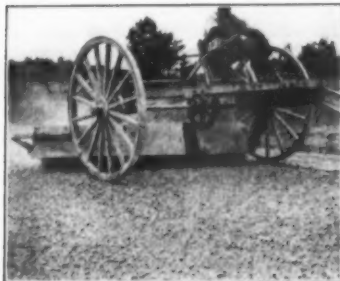
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MOTO-MIXERS

AND AGITATORS



C. & E. M. Photo
A Rotary Broom Pulled by a Truck
Cleaning Loose Stone from the Surface
Ahead of the Two-Shot Seal

Surface Treatment On Georgia Highway

(Continued from page 1)

the road as desired. Beale found the device a great help in getting the best results in the quickest possible time with the fewest trips over the road. One of the greatest blessings of the broom was the way it made the joints between two runs of stone and asphalt. By the gradual lifting of the brooms at the joint with the hydraulic pump, the material was feathered and a truly smooth joint was produced. The machine was run usually at between 4 and 7 miles per hour.

The Top-Soil Base

This State Project 1124-A, Reopened, Oglethorpe County, consisted of placing a top-soil base and surface treatment over the old road with some realignment at curves. After the subgrade was shaped with a 9 x 12-inch timber with road machine blades and with a Caterpillar 44 blade pulled by an Allis-Chalmers Model K tractor and the shoulder material bladed out, 12 inches of selected top soil was hauled in and compacted to 8 inches. This was placed between 2 x 12-inch plank forms which were pulled after the base had been placed for some 1,000 feet ahead.

The top soil was loaded to a fleet of 10 to 15 trucks carrying 4 yards each. A Caterpillar elevating grader with a power-operated 42-inch belt and pulled by a Caterpillar Sixty-Five gas tractor loaded the trucks at the borrow pit located about 3,900 feet average haul from the road. The top soil was thoroughly mixed on the road with a 28-inch diameter 16-pan King Plow Co. extra-heavy S.O.B. disk harrow pulled by the Allis-Chalmers tractor. This was bladed to a 2-inch crown with a No. 10 Caterpillar Auto Patrol during and after rolling with a 10-ton 3-wheel Huber roller.

Traffic used the road during the winter, although ordinarily it would have been stabilized within two weeks after the final shaping. Ninety pounds per square yard of $\frac{3}{4}$ to $\frac{3}{8}$ -inch crushed granite was spread over the surface of the top-soil base and scarified and mixed into

the base for a depth of 4 to 6 inches with the disk harrow. This was shaped with the Auto Patrol and then compacted with the 10-ton roller. This was required to be open to traffic for a period of from 10 to 30 days and rolled with a Bros 9-wheel pneumatic-tired roller for 10 days to hasten the compaction as this roller has the effect of intensive traffic.

Bituminous Treatment

The stabilized top-soil base was primed from end to end in about three days' time by the contractor, using his own Littleford 800-gallon distributor. The prime was placed 21 feet wide for the 20-foot roadway and at the rate of 0.35 gallon per square yard. The road was closed to traffic for three to four days and then traffic allowed on it for about ten days before the next operation.

At the end of the traffic curing of the prime, the surface was shot with 0.4 gallon per square yard of a 180-penetration asphalt, AC-18 in Georgia, and immedi-

(Concluded on page 23)

New Tractor Shovels

The Frank G. Hough Co., 919 No. Michigan Ave., Chicago, Ill., has announced two new tractor shovel models for International T-35 and TD-35 tractors which have been modified especially for shovel service. This modification includes special long tracks, six-roller truck frames, spring loaded foot clutch, double steering clutches, and reverse

radiator fan.

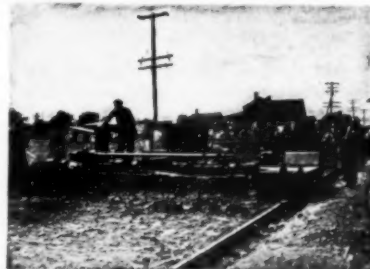
The manufacturer states that several thousand Hough tractor shovels are in service today on crawler and wheel-tractor models, handling all types of loose and bulky materials.

A new bulletin No. P-114, describing the T-35 and TD-35 tractor shovels, has just been issued. Copies may be secured by contractors and state and county engineers direct from the manufacturer.

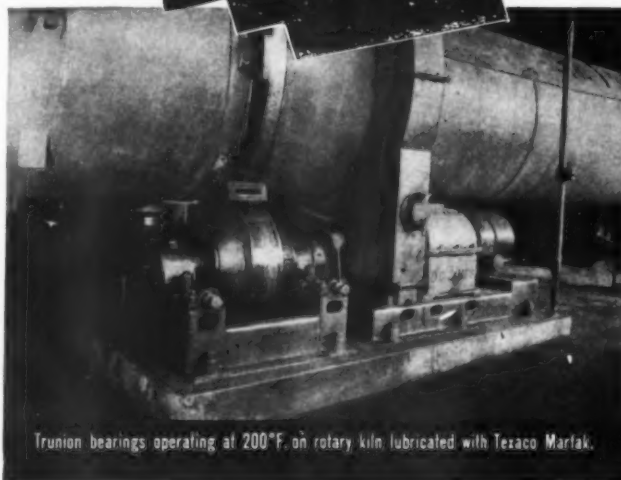
"ASK ANY CONTRACTOR"

Contractors who use "FLEX-PLANE" wide screed finishing machines say it is the only machine that saves concrete—irons out a true surface—prevents honey-combing and scaling. The "FLEX-PLANE" single 20" wide screed always cuts the concrete in the same plane.

FLEXIBLE ROAD JOINT MACHINE CO.
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HOT SPOTS TO LUBRICATE



Trunion bearings operating at 200°F. on rotary kiln lubricated with Texaco Marfak.



Close-up of bull gear and ring driving mechanism. Texaco Crater Compound keeps gear teeth continually protected.

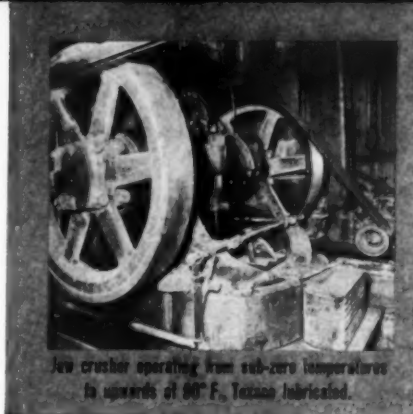
Crushed-Slate Processor Solves the Problem

WITH THEIR BIG ROTARY KILNS operating at 2200°F., their driving gears and trunion bearings continually exposed to temperatures of around 200°F., Minnesota Mining & Mfg. Co., at their Wausau, Wisc., plant, had a tough lubrication problem to handle. To meet this "red hot" situation, they turned to Texaco, specifying Texaco Crater Compound for the kiln bull gears, Texaco Marfak for the trunions.

For more than 2 years these lubricants have performed splendidly, withstanding these extreme bearing temperatures and pressures perfectly. During this period there have been no failures, no shut-downs due to lubrication.

Texaco engineers experienced in the selection and application of Texaco Lubricants for high temperature conditions gladly offer you their help. For this engineering service, or to place an order, phone the nearest of our 2229 warehouses, or write:

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New York Standardizes Traffic-Line Marking

Careful Study Made of Hazardous Locations Before Determining Type of Marking To Be Used; Three Types Of Lines Should Reduce Accidents

(Photos on page 4)

♦ BELIEVING that the vast majority of motorists are not only willing but anxious to drive safely, provided that they are given reliable and intelligent information which will enable them to do so, the Division of Highways of the New York State Department of Public Works has given special study to the subject of traffic-line markings during the past year. Experience has shown that where pavements are divided into lanes by lines painted on the pavement and other special markings used, traffic friction has lessened, the number of accidents is reduced and the movement of traffic expedited.

The matter of these markings has been made more difficult by the fact that there is at present no uniformity among the different states as to the markings used. However, a system has been adopted and was put into practice this past summer in New York State which is in line with the general practice in the majority of states and which, it is believed, will not differ to any great extent from that which will be adopted as a national standard when engineering opinion on the subject finally becomes crystallized, according to H. O. Schermerhorn, Commissioner.

The Single Broken Line

The new system is based on the use of three different kinds of lines. The first is the single broken line and is used to show motorists the lanes in which they should travel. A motorist will not necessarily be in danger if he crosses the single broken line, but his chances of an accident will be less, and traffic will move faster and more smoothly, if cars stay in the lanes marked by the lines.

The law requires that vehicles travel in the outside lane except when passing, and one of the purposes of the single broken line is to show motorists the lane in which they must travel in order to obey the law. Cars should not straddle the broken line, nor any other line. When a car is driven with wheels on each side of a line, two lanes are blocked and passing is made dangerous.

The Single Solid Line

The second type of line is the single solid line. This line should not be crossed except under unusual circumstances, and only when no approaching car is in sight. Any motorist who crosses it is taking a chance of serious accident, unless he uses great caution and is sure that it is safe to do so.

Its principal use is to separate traffic moving in opposite directions, and obedience to it will prevent head-on collisions. When so used, it is a substitute for the raised medial strip or grass plot built in the center of modern divided-lane highways. It is also used at intersections, where it is essential that traffic stay on its own side of the road if confusion and accidents are to be avoided.

The Double Line

Two types of double lines are used, one being a broken line parallel to a solid line, and the other parallel solid lines.

Conditions are frequently encountered along the highway where a driver traveling in one direction can see sufficiently far ahead to enable him to use his judgment as to whether or not it is safe to pass, but where the vision of a driver moving in the opposite direction is so restricted that it is not safe for him even

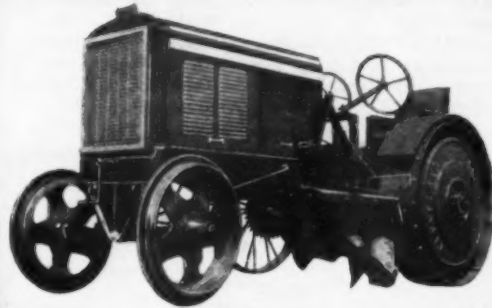
to start to pass. An example of this is on a hill, where a driver going up the hill can not see over the brow and therefore should not attempt to pass a car ahead, but where a driver coming down the hill on the opposite side of the road may have a sufficiently long sight distance

ahead to allow him to pass with safety.

To avoid unnecessary delay to the motorist who can see approaching cars at a reasonable distance, and at the same time to warn the other who can not, it is necessary to use a type of marking, the meaning of which differs in accordance

with the side from which it is seen. The double line consisting of a solid line and a broken line, painted side by side, accomplishes this purpose. If the broken line is on the driver's side, the double line becomes a warning only. The driver

(Concluded on page 30)



CLEVELAND FORMGRADER

CLEVELAND

Paving Equipment

One operator and a Cleveland Formgrader will cut all your form trench much more accurately and a great deal faster than you can do it by hand.

Also write to us for prices on

Trailgraders—Push Planers, Concrete Strike-Offs, Subgrade Test Templates, Floats, Bridges and Straight-Edges

The Cleveland Formgrader Company

6725 Denison Ave.,

Cleveland, O.



"But, Jake, the gas station feller said we'd orter have lead"

THE "gas station feller" was right as far as he went. But he certainly left the boys in the dark on what *kind* of lead he meant.

The "lead" that helps a bus or truck engine develop more power is *tetraethyl lead*, a volatile liquid which mixes completely with gasoline.

Oil companies add tetraethyl lead to gasoline to raise the anti-knock value so that the ignition timing of modern

engines can be advanced to give better or best performance. The measure of anti-knock value in gasoline is its "octane number." The larger this number, the greater is the anti-knock value of the gasoline.

When you buy leaded gasoline of high octane number you can set the ignition timing of your engines closer to the maximum power position without knock. These better gasolines give you other ad-

vantages in addition to high anti-knock quality—balanced volatility, vapor pressure low enough to prevent vapor lock and low gum content.

If you have questions about truck and bus fuels and any special conditions under which your fleet must use them, write the Ethyl Gasoline Corporation, Chrysler Building, New York, N. Y., manufacturer of anti-knock fluids used by oil companies to improve gasoline.

4 RULES FOR GOOD GASOLINE			
<p>VOLATILITY should be balanced, for full power and best economy.</p>	<p>VAPOR PRESSURE should be adjusted to meet operating conditions.</p>	<p>GUM CONTENT should not exceed 1/4 of a gram (4 small drops) per gallon.</p>	<p>ANTI-KNOCK VALUE should be high, at least 68 octane number.</p>

THE BETTER THE GASOLINE THE BETTER THE PERFORMANCE

Bituminous Conference To Be Held Next Month

The 1939 Montana National Bituminous Conference will be held at Sun Valley, Idaho, September 11-14. The Conference program will be comprised of five sections: 1. Research as Applied to Construction and Maintenance of Bituminous Surfaces, Professor W. S. Housel, Research Consultant for the Michigan Highway Department, Chairman; 2. Fundamentals of Bituminous Construction, J. E. Buchanan, Dean of Engineering at the University of Idaho, Chairman; 3. Design and Construction

of Bituminous Surfaces, C. F. Seifried, Office Engineer of the Wyoming Highway Department, Chairman; 4. Maintenance of Bituminous Surfaces, T. R. Perry, Bituminous Engineer of the Iowa Highway Commission, Chairman; 5. Round Table Discussion, J. W. Powers, Engineer of Materials for the Arizona Highway Department, Chairman.

Following the conclusion of the sessions on the four main subjects, a round table discussion will be held during which all points which have not been covered in the preceding sessions may be brought up for discussion.

Papers will also be presented on two new features at this year's meeting: The Importance of Design, Construction and Maintenance of Bituminous Surfaces to National Highway Safety; and The Bituminous Highway Surface of Tomorrow.

The Executive Committee for the Conference is composed of D. A. McKinnon, State Highway Engineer of the Montana Highway Department, General Chairman; D. L. Cheney, Bituminous Engineer of the Montana Highway Department, Assistant General Chairman; H. R. Flint, Director of Highways in Idaho, Vice Chairman.

Further information on the Conference may be secured direct from Mr. D. L. Cheney, Bituminous Engineer, Montana Highway Department, Helena.

Folder on Concrete Carts

Catalog Form No. C-1, recently issued by Red Star Products, Inc., 12910 Taft Ave., Cleveland, Ohio, describes and illustrates the Model A, B, and C concrete carts manufactured by this company. All three models are equipped with pneumatic tires, sturdy Red Star disc wheels and sealed wheel hubs with Timken bearings.



J&L Precisionbilt GILMORE WIRE ROPE HELPS KEEP
YOUR SHOVELS ON THE JOB - WORKING ECONOMICALLY



J&L Gilmore Wire Rope assures economical and efficient digging and loading operations — because it has the strength, flexibility and abrasion-resistance to stand up under long, continuous service.

Made of J&L Controlled Quality Steel on the world's newest wire rope making machines — which work to a tolerance of 1/1000 of an inch — Precisionbilt wire rope has toughness and uniformity which account for its long life and wear-resisting qualities.

Every strand is perfectly lubricated by a new scientific process.

When you are making wire rope replacements on your shovels, buckets and drags, or when you order new equipment, specify J&L Precisionbilt. Write today for our wire rope catalog.

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS

GILMORE WIRE ROPE DIVISION
PITTSBURGH, PENNSYLVANIA

**J&L
STEEL**



J&L — PILOTS THE COURSE OF
CONTROLLED QUALITY IN STEEL

J & L — PARTNER IN PROGRESS TO AMERICAN INDUSTRY

Airport in Alaska Presents Problems

Soil Conditions, Delays in Securing Equipment, and Weather Complicate Work At Bethel

By HAWLEY STERLING, Assistant
Chief Engineer, Alaska Road Commission

THE village of Bethel, Alaska, head of navigation for sea-going vessels on the Kuskokwim River, is situated on the right limit of the river, 60 miles from its mouth, at a point marked by the first high ground in a vast region of flat marshland studded with myriads of lakes. Typical of most river villages, the houses, cabins and shacks parallel the river bank at a point presumably above ordinary high water. A part of the town extends along the bank for a half mile into low ground, which is flooded during the break-up period. Primarily a fur trading center, inhabited principally by Eskimos and half-breeds, Bethel has recently become a supply point for various mining activities within a radius of a hundred miles.

Up until two years ago, pontoon planes transported supplies from Bethel to those camps situated near a suitable landing place afforded by an inland lake or a small river. Later a make-shift landing field was constructed on a low willow island on the opposite side of the river 2 miles from the village. The mining camps then built landing fields close to their operations.

In 1937, through an emergency relief appropriation of \$50,000, the Alaska Road Commission was authorized to construct a suitable landing field close to the village. Although not a large expenditure for an air field in the States, in Alaska this was a considerable sum, there being only 2 out of 115 fields which have cost more. The average cost has been about \$4,000.

Preparations for Work

The only site available was on the tundra, which consists of hummocks of moss, fine roots and grass built up to varying depths through the ages from lack of drainage. Mixed with it may be wind-blown sand, volcanic dust, river silt and decayed vegetation, interspersed with which are lenses of ice which may be $\frac{1}{4}$ inch to 1 or 2 feet in thickness. The whole is frozen solid except for a depth of 18 inches to 2 feet which thaws in the summer. The problem then was to remove the tundra to get down to firm soil, or to haul in material on top of the tundra with as little disturbance as possible, utilizing it as insulation against the thawing of the permanent frost.

Test pits 8 feet deep showed that the area selected was covered with a blanket of tundra to at least that depth. This left the alternative of hauling in material and placing it on top of the tundra.

The 40-foot river bank situated 600 feet from the nearest corner of the proposed field consisted of a very fine silt with occasional streaks of fine flaky sand, and the nearest gravel was 18 miles up the river. Although 12 per cent of this material would pass a 200-mesh screen and all would pass a 10-mesh screen, it was decided to use it. It was estimated that 70,000 yards would be required for a runway 200 x 2,500 feet and a cross runway 200 x 2,000 feet.

Securing Equipment

When these decisions were made, the necessary equipment was then ordered. As this was an unusual job and as it was very unlikely that a similar one

would be encountered in the future, it was essential that the work be done with equipment which could be used for the road work in the vicinity after the field was completed. Three $1\frac{1}{2}$ -ton dump trucks, a light $\frac{3}{8}$ -yard shovel, a 45-hp oil-burning tractor with a hydraulic bulldozer, and a 6-yard hydraulic scraper were purchased.

It was planned to rush the job to completion so that the equipment could be shipped out on the last boat of the season for use on some road work 500 miles up the river. On the original estimate it was figured that the shovel and trucks could average 250 yards a shift, including breakdowns, and the tractor and scraper could haul the same amount by working 8 hours. Thus, with good luck, it was believed that 90

days double-shift would complete the work at the airport.

The Work Starts

The boat from Seattle, bringing the equipment, arrived on June 10 and on the 12th the equipment had been barged across the river from the Island and was ready to go to work. The foreman for this job was a practical man of more than 20 years' experience in Alaska road work, selected because of his varied experience, which included construction of roads through country where tundra was encountered. He had never seen an oil-burning tractor or a dirt-moving scraper.

Two shovel runners and a mechanic were brought in by plane from Anchorage, besides the foreman, and all others on the job were hired locally. These included two tractor drivers, neither of whom had ever operated a bulldozer, and six truck drivers, only three of whom had ever driven a truck and very little at that.

A road from the pit-bottom level at

an elevation about 25 feet above the river to the near corner of the field was laid out on the tundra on the edge of a gully, with an average 8 per cent grade, and with one pitch of 30 feet on a 15 per cent grade. The usual practice in constructing a road over tundra is to lay a mat of corduroy on the undisturbed tundra and then cover it with the best available material. The corduroy may consist of anything from

(Continued on page 38)

**TARPAULINS
ROAD MATS
WINDBREAKS** ★

write for prices

CONTRACTORS' SUPPLY DEALERS in every state sell the Fulton line. Specify SHURE-DRY and FULTON Tents, Tarps, and Windbreaks—anything made of canvas. Also Fulton Road Mats and Burlap. Fulton products are good and their prices are right.

If your dealer can't supply you write our nearest plant for catalog, samples and price list.

Fulton Bag & Cotton Mills

Manufacturers Since 1870

ATLANTA ST. LOUIS DALLAS
MINNEAPOLIS NEW YORK NEW ORLEANS PHOENIX CITY, ARK.

Not an Ounce of Lazy Horsepower in the New INTERNATIONAL TD-18



A new day is here for users of heavy-duty mobile power! The new 70 h.p. International TD-18 Diesel TracTracTor brings a new standard of operating performance and economy into the picture . . . more work, lower costs, bigger profits.

The power and flexibility of the International 6-cylinder full Diesel engine are coordinated to a fine point with other features in the TD-18 . . . a higher percentage of the maximum drawbar horsepower—70 h.p.—can be kept continuously applied to get more work done per day at lower cost.

The engine starts easily and quickly from the operator's seat—no time lost by man or machine in getting on the job.

The TD-18 is the easiest steering crawler tractor built. Engine power, not manpower, releases the

steering clutches through power-release actuators built into the clutches.

Six forward and two reverse speeds provide close selection of traveling speed to load without loss in engine r.p.m. or maximum horsepower capacity. Automatic clutch brake facilitates fast shifting of gears.

These features enable the operator to take full advantage of the power available . . . and make the TD-18 unusually easy to handle and easy on the operator.

Find out what the TD-18 offers for your jobs. The nearby International industrial power dealer or Company-owned branch will give you full details. Remember that there are five other TracTracTors in the International line, also five wheel-type tractors, and eleven power units.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)

180 North Michigan Avenue Chicago, Illinois

INTERNATIONAL Industrial Power

Unusual Tunnel Job Carried Out by County

(Continued from page 2)

weather and "under cover" so to speak. The excavated material was worked out of a practically solid face and by throwing it down through the traps minimum labor was involved, everything moving by gravity with no shoveling into cars.

All the work on the road and tunnel jobs was by hand labor. In the excavation about 30 Swede cars, five to six in a train, and five hoists for pulling, were used. The full-load capacity of the cars was about 1½ cubic yards.

Personnel

The road was started June 22, 1938, while the work on the tunnel did not get under way until November, when the pilot tunnel was started. W. L. deWitt was WPA Resident Engineer, Lee Bates was Road and Tunnel Project Superintendent and W. R. Thomas, Tunnel Superintendent.

Build Your Own Gas Welder

A helpful booklet "Tips on Building Your Own Gas Welder" has just been issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Penna., and

is designed particularly for contractors with small repair shops and for state and county district maintenance shops, where the amount of repair work does not justify the purchase of a complete unit.

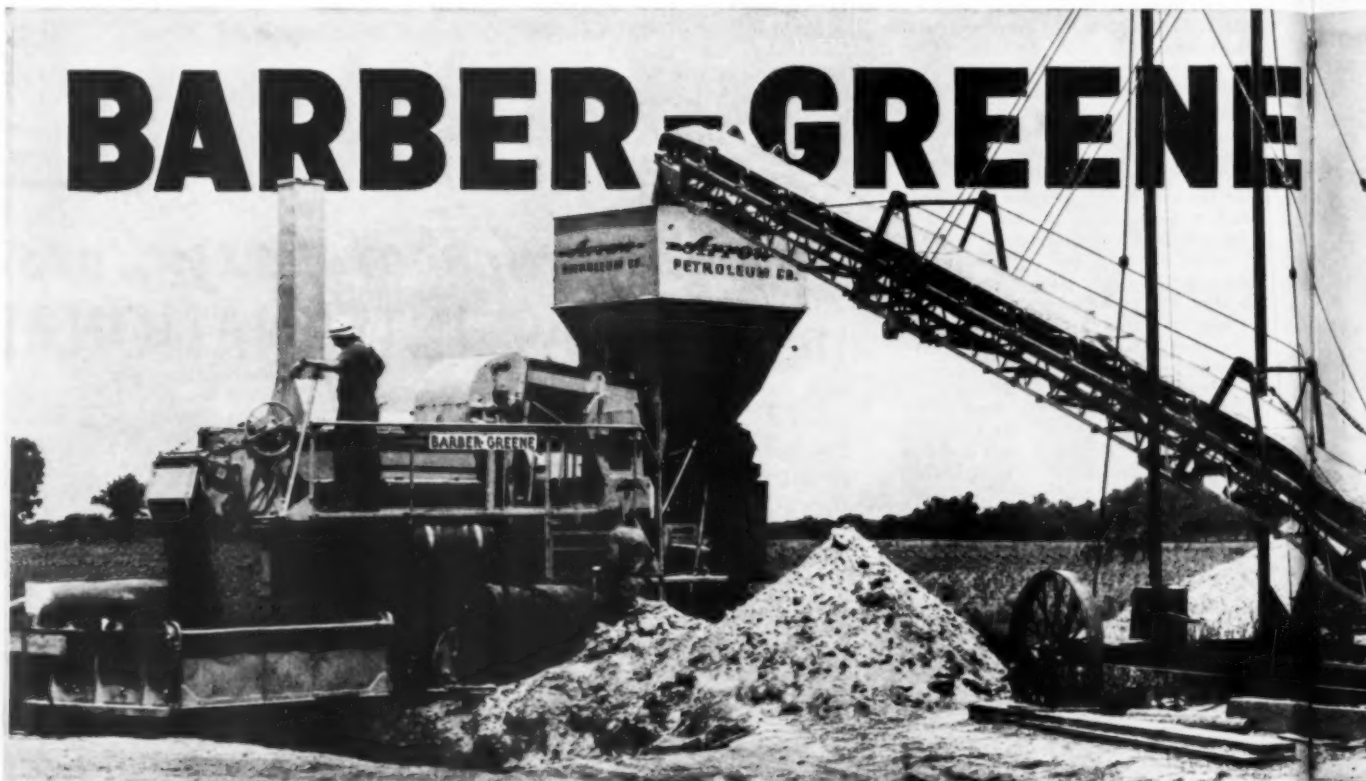
The booklet discusses the bedplate, mounting the engine, the generator, the idler and governor, the radiator, fuel tank, canopy and sides, and the portable parts. Simply written, the suggestions include tables of minimum engine sizes for given generator ratings, as well as electrode sizes and welding ranges; fuel consumption for different generator capacities; and prices on electrical parts.

Copies of this booklet, B-2205, may

be secured direct from Westinghouse, Dept. 7-N-20, or from this magazine.

New Dealers to Handle Concrete Mixers, Pavers

Announcement has been made by the Ransome Concrete Machinery Co., Dunellen, N. J., of the appointment of two new dealers. Stuart M. Christliff & Co., 200 E. Lombard St., Baltimore, Md., will handle the complete line of Ransome concrete mixers, truck mixers, and pavers in the state of Maryland, and Wilkinson & McClean, Ltd., 10235 103rd St., Edmonton, Alberta, Canada, will serve as Ransome dealer in Alberta.



THIS is a typical low cost, high capacity Barber-Greene Bituminous Drying, Mixing, and Finishing Plant. You'll be interested in the essential facts listed below:

Contractor—Arrow Petroleum Company, Chicago, Ill.

Job — Paving road north of Barrington, Illinois. 3½ miles long, 20 feet wide, 2½" thick.

Actual Plant Production—125 Tons Per Hour.

EQUIPMENT AND LABOR

Machines	Operators	Laborers
1—¾ Yard Clam Shell	1	0
1—Barber-Greene Reciprocating Feeder	2	2
1—Barber-Greene Bucket Elevator		
1—Barber-Greene Dual Drum Dryer		
1—Boiler		
1—Barber-Greene 60' Portable Conveyor	2	1
1—Barber-Greene Mixer		
1—Barber-Greene Tamping Leveling Finisher..		
1—Roller	1	0
TOTALS	6	3

The above tabulation does not include trucks or drivers for delivering materials to the plant, or for hauling the mix from the plant to the Finisher. This equipment varies, depending upon the length of haul.

Type of Mix — Illinois C-6 Specification using dense graded aggregate from 1" to 200 mesh, adding 4.42% RT-7 Tar at 170° F.

Drying—Removing 5% moisture from aggregate at 125 tons per hour.

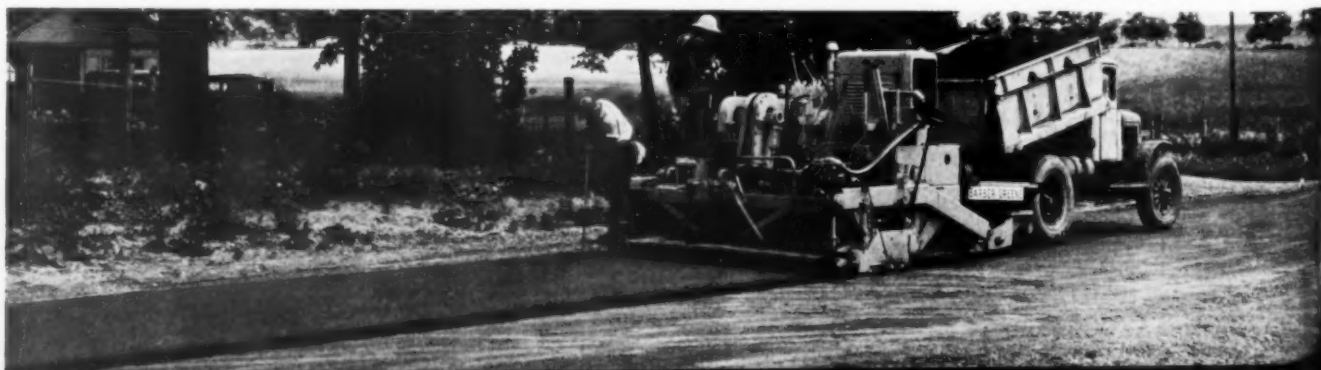
Cooling—Aggregate cooled to 180° F. by B-G Conveyor prior to mixing.

MOBILITY—The B-G units are built to be moved from one job to another with the least time and expense. This has been most successfully accomplished by having all of the units complete, independent assemblies that may be moved easily with practically no knocking down. Setting up the plant like the one above is chiefly a matter of arranging the units. Pneumatic tires on the Dryer and Mixer greatly facilitate the moving operation.

VERSATILITY—The owner of this B-G Equipment is not restricted to any type of mix or set-up.

He has the basic equipment for every type of bituminous and stabilizing job.

For the high type mixes, bituminous concrete, etc., he can add B-G screen and bin control equipment for separately handling and separately proportioning the different sizes of graded aggregates.



W.P.A. Amendment Passed by Congress

The amendment to the WPA Act limiting the purchase of equipment, which was sponsored by the American Road Builders' Association, has been passed by both Houses of Congress and signed by the President. The amendment as finally adopted is as follows:

"Provided that the funds appropriated in this Section shall not be used for the purchase of any construction equipment or machinery in any case in which such equipment or machinery can be rented at prices determined by the Commissioner to be reasonable, and his deter-

minations, made in conformity with rules and regulations prescribed by him, shall be final and conclusive."

Another interesting change in the WPA is that on and after January 1, 1940, not less than 25 per cent of the cost of a WPA non-Federal project shall be borne by the state and its political subdivisions. This, of course, throws a portion of the relief burden back to the states, counties, cities and towns.

Under Section 12 of the WPA Act, no funds shall be expended on the construction of any building on which the portion of the total estimated cost payable from Federal funds, in the case of non-Federal building, exceeds \$52,000.

This is in connection with projects approved after July 1, 1939.

Engineer Firm Celebrates Twenty-Fifth Anniversary

Fay, Spofford & Thorndike, Engineers, Boston, Mass., celebrated the twenty-fifth anniversary of the formation of the firm by holding open house at the Engineers Club on June 30.

Partners of the firm include Frederic H. Fay, Charles M. Spofford, John Ayer, Bion A. Bowman, Carroll A. Farwell, and Ralph W. Horne. The principal engineers include E. B. Myott, H. J. Williams, W. L. Hyland and F. L. Lincoln.

Heavy-Duty Trailers

Jahn Super-Built heavy-duty trailers, features of which are sturdy frames, goose-neck construction, the brake and axle design, and pneumatic tires, are described in a new catalog recently issued by the C. R. Jahn Co., 1347 W. 37th Place, Chicago, Ill. Available in a variety of sizes and styles, these trailers are designed for transporting heavy machinery and materials over the highways.

Copies of this new catalog may be secured by interested contractors and state and county highway engineers direct from the manufacturer.



PERFORMANCE Facts

In combination with a B-G Bucket Loader, he can operate as a Travel Plant on all types of bituminous work, including: Tars; RC, MC, and SC Cut-back Asphalts; Emulsions; as well as all types of stabilization, including: Clay, Salt, Emulsion, Tar, Asphalt, Cement.

B-G MIXER—Backed up by approvals and enviable records of 83 machines sold in the past few years, the Barber-Greene Mixer is thoroughly established as the outstanding machine for high capacity, high portability, low cost operation, and close control.

B-G FINISHER—The Barber-Greene Tamping Leveling Finisher has set new standards of excellence for bituminous paving. This machine, probably the most ingenious design in the road building industry, has been manufactured on a production schedule for the past two years.

B-G DUAL DRUM DRYER—This, the newest Barber-Greene, completes the B-G line of bituminous equipment. Having undergone close observation in the field for over a year, this new unit is now released. Its combination of high capacity and high portability is accomplished by two parallel drums of comparatively shorter length and smaller diameter, splitting the volume to be dried, and getting a higher drying efficiency.

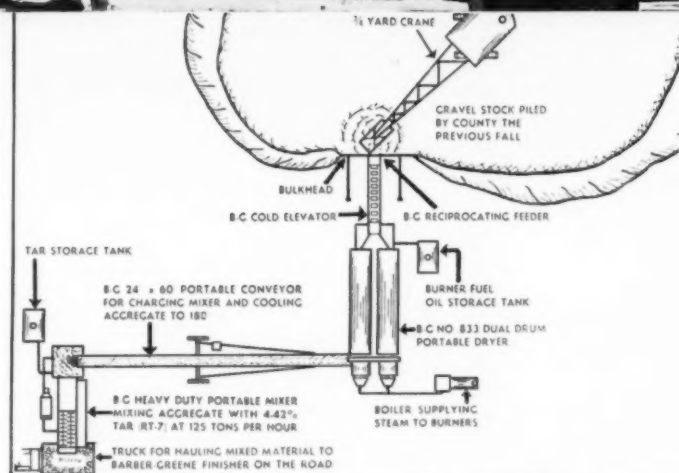
Literature on all of these Barber-Greene's will be sent on request. Phone, write, or wire. There is no obligation.

BARBER GREENE

AURORA, ILLINOIS

39-25

Below: B-G Mixer operating with B-G Bucket Loader as Travel Plant.





The Bureau of Reclamation Built a Large Part of the 65-Mile Main Canal of the Deschutes Irrigation Project Near Bend, Oregon, with 95-Hp Caterpillar Tractors and Angledosers. In Rock, These Outfits Did the Stripping, and Dynamite and Draglines Finished the Job. But in Good Soil the Tractors Did the Whole Job.

A New Spark Arrester For Diesel Exhausts

In many locations the flying sparks from the exhausts of diesel engines are troublesome and hazardous. To trap these, the Burgess Battery Co., Acoustic Div., 500 West Huron St., Chicago, Ill., has developed a new spark-arresting type of exhaust snubber. Like all Burgess exhaust snubbers, this new Model SDHS retards the slugs of high velocity exhaust gas which rush into the exhaust pipe and bleeds them to low pressure before any noise can be created. Thus, the snubber prevents the building up of line surges and peak back pressures which cause high fuel consumption.

Two methods of spark removal are utilized in this design. Because of the large cross sectional path, the velocity of the gases is very low and the heavier particles tend to separate out by gravity. Further, the exhaust gases change direction and velocity so that the remaining finer carbon particles are thrown out due to centrifugal action. The carbon and ash drop into a large chamber in the bottom of the snubber, which is set up vertically, where they can be removed through a hand hole.

This snubber does not require tuning and can be installed anywhere in the exhaust pipe system and it ought to operate equally well with any kind of engine as long as it is installed vertically.

Leaning-Wheel Graders

A new 24-page illustrated catalog completely describing three models of Adams leaning-wheel graders in 8, 10 and 12-foot blade sizes, with power or hand controls, has just been issued by the J. D. Adams Co., Indianapolis, Ind.

graders and illustrate the mechanical and operating features.

A copy of this catalog may be secured by interested contractors and state and county highway engineers direct from the manufacturer by mentioning this item, or from this magazine.

New Material-Handling Equipment Catalog

A 960-page catalog containing valuable information on its complete line of chains, reduction, and all types of material-handling equipment has recently been issued by the Jeffrey Mfg. Co., Columbus, Ohio. The data in this book is so presented, according to the manufacturer, that the engineer can incorporate this class of equipment in his plans with the least amount of effort and delay. It covers the Jeffrey line of conveyors, elevators, chains, sprockets, transmission machinery, electric vibrating feeders, screens, dryers, crushers, etc., is profusely illustrated and contains well-arranged tabular matter.

A copy of this General Catalog No. 87 may be obtained by writing direct to the manufacturer on your official or company letterhead.

CONCRETE VIBRATORS (Gas and Electric) Concrete Surfacing Attachments



Master Vibrator Company, Dayton, Ohio
DISTRIBUTORS IN ALL PRINCIPAL CITIES

Action and still pictures show the many types of work being done with these

Here's a cable bracket
that saves
\$100⁰⁰ per mile

OSGOOD



Power Shovels
Draglines
Cranes, Etc.

Write for New
Descriptive Bulletins
3/8 to 2 cu. yds.

THE OSGOOD CO.
MARION, OHIO

WHEREVER State Highway Departments call for a cable bracket with an ultimate strength of 10,000 lbs., this low-cost Bethlehem bracket will fill the bill. Simple, rugged, easily installed, it fully meets requirements of most locations.

Price of the above bracket alone, the CG-635, is more than 10 per cent under most designs for 4-cable spring brackets. A similar bracket, but for three cables (CG-633), represents an even greater saving.

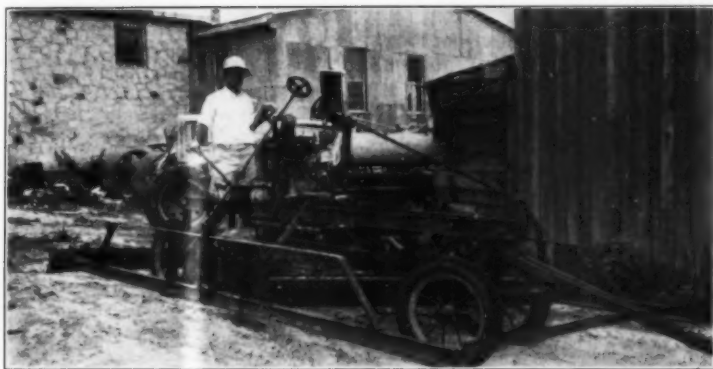
This lower cost represents no sacrifice in quality. The design is such that less material is required to

amply meet strength requirements. It provides the full guard-rail efficiency that can be given by more expensive brackets. It makes use of the same material: the same sturdy fastening, requiring no tools except a wrench; the same galvanizing; the identical quality and weight of steel.

We recommend this bracket for new work and for replacement on existing cable guard-rail installations. It is interchangeable with all types of spring, off-set brackets. Write Bethlehem Steel Company, Bethlehem, Pa., for details and prices.

BETHLEHEM STEEL COMPANY





C. & E. M. Photo

The Hydraulic-Controlled Gledhill Maintainer Equipped with Brooms for Mixing the Surface Seal

Hydraulic Brooms Speed Georgia Job

(Continued from page 16)

ately covered with a one-stone layer of crushed granite spread from Gibbes boxes built into the tail gates of each one of the trucks. The boxes are controlled by hand as to the amount of the material that is distributed. The stone for this surfacing was from 1-inch down to 1/2-inch and applied at the rate of 52 pounds per square yard. The spreading of the stone was followed by a gang of eight men hand-brooming and four men with shovels spotting the stone where it needed some evening over the surface. This was rolled with a 5-ton roller. A heavier machine would have been disastrous as the granite is soft and crushes very easily. Traffic was allowed to use the road and whip the excess stone to the side, assisted by about eight men with brooms.

Prior to the seal the road was broomed with a rotary broom pulled by a truck. This same rotary broom and a home-made blower were used to clean the base before the prime was applied. The blower consisted of a frame on which was mounted an old Chevrolet engine and gear shift connected to a cotton-gin blower with suitable piping to the road level. The outfit was lifted from horses in the contractor's garage and placed on a truck with the blower attachment hanging over the end of the truck. As the Superintendent who made the outfit remarked, "You could knock

the rocks off the road with that blower." No dust was left when it had passed.

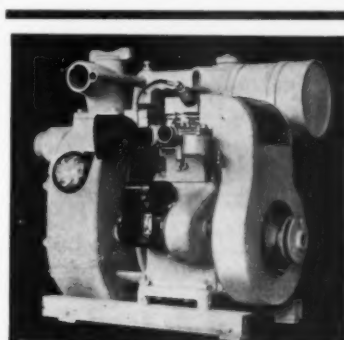
The first asphalt seal consisted of 0.13 gallon of RC-1 over which was spread 21 pounds of 3/8-inch to No. 8 stone and broomed by four men with hand brooms and a light drag broom. This was fol-

lowed as soon as possible by a final shot of RC-1 at 0.27 gallon per square yard which was mixed and blended by the hydraulic broom already described. Finally the surface, after it had been thoroughly mixed with the broom, was rolled with the 5-ton roller and closed to traffic for three to five days to cure. The job was then complete and ready for traffic.

Personnel

The contract for the surface treatment of the top-soil stabilized base on State Road 77 northeast of Lexington, State Project 1124, was awarded to Joseph R. Cothran, Jr., of Atlanta, Ga., on his low bid of \$59,815.90. For the contractor, G. W. Beale was Superintendent, and for the State Highway Board of Georgia, H. O. Elder was Resident Engineer.

State Highway Engineers! Keep the Annual Roadside Development Awards in mind to insure your state's being in the running for them.



2" Light-Weight High-capacity, Self-priming Pump

Total weight 97 pounds, including 2-hp. air-cooled engine. Guaranteed self-priming up to 25'. Total head 50', 8,000 g.p.h.

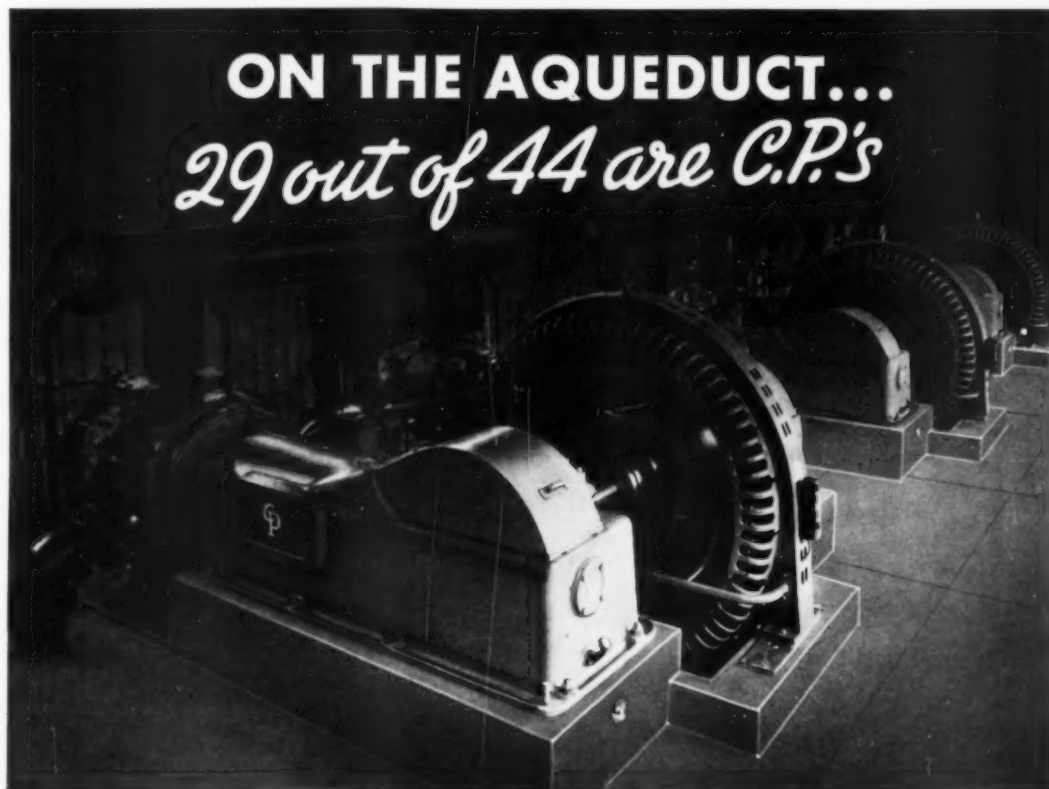
Ask for Bulletin 22-W

Made by

MARLOW PUMPS

Ridgewood

New Jersey



Of a total of 44 stationary compressors at the various shafts of the Delaware Aqueduct, 29 compressors are CP's...selected for their acknowledged dependability, efficiency and low maintenance cost. » » » More than 150 CP Rock Drills have already been put into service on this outstanding tunnel project.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 6 EAST 44th STREET, NEW YORK, N. Y.

SALES OFFICES AND SERVICE STATIONS THROUGHOUT THE WORLD



STATIONARY AND PORTABLE COMPRESSORS

LAYING BLACK TOP?



JAEGER PAVER has 10 ADVANTAGES:

- 18 Ft. Movable Forms Give Smoothness of Concrete,
- 50% More Traction,
- No Load on New Material,
- Adjustable 9 to 14 Ft. Widths,
- Blends Perfect Joints,
- Capacity to 1000 Tons a Day,
- Lays Hot or Cold Bituminous, Stone or Macadam,
- Pug Mill Spreader,
- Less Hand Finishing,
- Automotive Construction,

Write for New Catalog, Prices.

THE JAEGER MACHINE CO.
701 Dublin Ave., Columbus, Ohio

JAEGER



SUMMER'S HEAT OR WINTER'S COLD

**ADAPTS
ITSELF TO
BASE
MOVEMENTS**

LINCOLN-ITE
PULVERIZED PETROLEUM ASPHALT
Trade-Mark Registered in the United States and Canada

THE OHIO OIL COMPANY
INCORPORATED

**ASPHALT
DIVISION**
•
**ROBINSON
ILLINOIS**



The New Alemite Wheel-Bearing Lubricator

Device for Greasing Truck-Wheel Bearings

A new type of wheel-bearing lubricator to improve the efficiency of this work has been announced by the Alemite Division of the Stewart-Warner Corp., 1828 Diversey Parkway, Chicago, Ill. This new lubricator can be used for both ball and roller wheel-bearings on all makes of trucks and assures uniform distribution of the lubricant as well as reducing lubrication time.

The Alemite wheel-bearing lubricator has an inverted cone shape. A bearing, after being thoroughly cleansed, is placed in the lubricator around a hollow threaded spindle equipped at the top with a standard Alemite fitting. The bearing is sealed tight to the sides of the cone by adapters which are held in place by a clamp screwed down over the spindle. Any grease gun may be attached to the fitting on the spindle to force the lubricant down through the spindle into the apex of the inverted cone and into the bearing. After the release of the clamp and adapters the bearing is ready for replacement.

Thorough and rapid cleansing of wheel-bearings, prior to lubrication, is now possible by means of an Alemite washer, an accessory to the wheel-bearing lubricator, in which a new piston-type gun pumps cleansing fluid through the bearing, removing all grease and dirt immediately.

Asphalt Maintenance Bulletins Available

A new series of bulletins devoted to Littleford asphalt construction and maintenance equipment has recently been made available by Littleford Bros., 485 E. Pearl St., Cincinnati, Ohio.

Bulletin 0-15 describes the Littleford Model M pressure distributor made in tank capacities from 500 to 1,000 gallons.

The Model C distributor with three types of spray bars to choose from, the full circulating spray bar, a standard spray bar, and a side nozzle spray bar, together with a continuous heat flue system using a low pressure burner and the single valve control, are featured in a special folder.

A new bulletin on the Model No. 101 utility spray tank shows how three units are combined in this one piece of equipment, a hand spray unit, a draw-off unit, and a spray bar unit.

The No. 84-HD kettle is the subject of another bulletin which illustrates the special features of this equipment, including double heat circulation, screen reservoir, a motor-driven spray and an oil burner heater.

The Model 150 motorized Wheeled Roller which trails at any speed, is self-operated on the job and designed particularly for patching is featured in a particularly well-illustrated folder.

The Littleford all-steel "Hand-Dee Box" for tools, which is equipped with

a safety catch, a safety cover lock and can be used either as a portable unit or as a stationary tool box, is described in a two-color folder.

Any or all of these bulletins will be sent free on request to readers of CONTRACTORS AND ENGINEERS MONTHLY mentioning this item and the specific bulletins required.

New Portable Tools

The new Velocity-Power industrial tools, designed to save time on such jobs as driving studs, punching holes, bonding pipe, tightening or removing rivets and cutting steel cable, recently announced by Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Penna., are claimed to provide the power and performance of cumbersome shop equipment in portable form on the job.

Utilizing energy created by the detonation of a sealed charge of smokeless powder, they are completely self-contained and easy to operate. The oper-

ator has at his disposal tons of pressure of useful power made available by using the simple principle of expanding gases directed against a movable piston. The only source of energy needed is a small blank cartridge or a special type of projectile unit. Each tool is supplemented by auxiliary hand tools and fittings for proper field maintenance away from any operating base.

A new bulletin illustrating and describing these new portable industrial tools may be secured direct from the manufacturer or from this magazine.

A Special Publication For Tractor Tool Operators

A new bi-monthly house organ was initiated in May by R. G. LeTourneau, Inc., Peoria, Ill., especially for operators of LeTourneau scrapers and other equipment. The publication is called "The Co-Operator," and will be sent free to any tractor operators. It is filled with good ideas, and every equipment owner who is interested in teaching

his operator to do more effective and profitable work should be sure that he is on the list. Write to LeTourneau and mention this item.

USE RIGHT BUCKET FOR THE JOB



Hayward makes all four—clam shell, dragline, electric motor, orange peel. A Hayward recommendation is unprejudiced.



THE HAYWARD CO., 32-36 Day St., New York

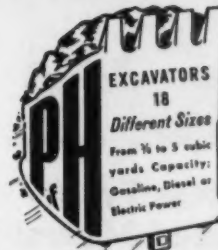
Hayward Buckets

"50,000 YARDS OF MATERIAL Without Any Expense for Parts!"

O. D. Welden Town Superintendent of Highways Potsdam, New York



● It takes a lot of passes to pile up 50,000 yards with a $\frac{3}{8}$ yd. shovel . . . in fact, that's 106,255 full dipper loads! Most machines would require replacement parts during or after a job like that, but not a penny was spent for parts on this P&H Bantam Weight. Even the original hoist cable was still in use. The greater strength and rigidity of P&H machines are the results of all welded construction of tough alloy steels—the design originated by P&H more than 5 years ago and which is now "5 years ahead of the field."



Write for literature on the size and type that interest you. Address the Harnischfeger Corp., 4419 W. National Avenue, Milwaukee, Wisconsin.

HARNISCHFEGER CORPORATION
EXCAVATORS • ELECTRIC CRANES • ARC WELDERS  HOISTS • WELDING ELECTRODES • MOTORS



The New Bucyrus-Erie 2-Yard Shovel

Improved Chain Crowd And Dipper on Shovel

A new 2-yard power shovel, the 44-B, is being offered by Bucyrus-Erie Co., with gasoline, diesel or electric power and can be converted for use as a shovel, dragline, clamshell or crane.

A new type of chain crowd has been incorporated in this shovel, giving a powerful crowd-out and high speed retract, thus saving time on every digging cycle. The crowd, hoist and swing are synchronized to give maximum output in all kinds of digging. Bucyrus-Erie states that the light strong front end affords the user exceptionally wide working ranges and big sheaves increase the rope life and provide favorable digging angles.

Special attention has also been given to the dipper, which has a short back, a curved door, and a smooth inside which flares outward to the bottom, improving the dumping action. The welded alloy steel dipper is equipped with inserted Beco Tiger Teeth made of forged tool steel and which are both reversible and replaceable. Readers interested in this 2-yard machine should write to Bucyrus-Erie Co., South Milwaukee, Wis., for a copy of the new 44-B bulletin and mention this magazine.

Clamp and Spreader For Concrete Forms

A type of clamp and spreader for wall construction has been developed by Ernest A. Podd Co., 520 Velasco St., Houston, Texas, which has proved very effective on many Texas jobs. The Speedee Spreader Clamp consists of a 3/4-inch channel with four grooves or notches to form planes of weakness so that the channels can be broken as desired inside and outside the forms and

stops punched out to hold the forms at the exact wall thickness. One of the grooves or notches is located 1 inch inside the forms so that the channel may be broken off 1 inch back of the finished wall. The outer notches or grooves are back of the sheeting. Slots at the end of the channels are used for the insertion of wedges back of bearing plates which rest against the wales.

For installing the Speedee Clamp a 1-inch hole is bored in the form and then after the spacer is inserted the opening is plugged with a half round wedge. When pouring is completed and the concrete has set the specified time and the forms are to be stripped, the wedges are knocked out, the channel broken outside the forms, and the form panels moved to the next position for pouring. Then, by means of a special but simple breaking tool, the channel is broken 1 inch inside the face of the wall within the recess made by the plug. The same procedure is carried out on the back of the wall and it is ready for filling the holes and final rubbing.



The Feathertouch Denominator for Traffic Counts

Counting Highway Traffic

The little hand counters that you have seen used to count people entering a hall, or a boat, have grown up. Now a convenient light-weight tabulator is available in units which will count from one to 60 different items. These Feathertouch Denominators made by The Denominator Co., 261 Broadway, New York City, are used extensively by highway traffic engineers to count and classify traffic at the same time.

Removable classification slips behind each key minimize errors. By simply pressing the key in front of the classification slips one tally is added to the indicating figure above. The machine is made of metal throughout, except the

composition plastic key tops. Wearing parts are of hardened steel. A reset knob at the left returns all counting units to zero. A folder describing the single and multiple Denominator units will be sent on request to those mentioning this item and magazine.

Is your job ever held up because of breakdowns? Keep your equipment up-to-date. Write for information.

Aeroil OIL BURNING CONTRACTORS' EQUIPMENT

- KETTLES FOR TAR, PITCH & ASPHALT • EMULSION DISTRIBUTORS
- POWER SPRAYS • LEAD MELTING FURNACES • WEED BURNERS
- TORCHES & BURNERS

Send for FREE Bulletin No. 100-C

Aeroil Burner Co., Inc.
West New York, New Jersey
Chicago San Francisco Dallas

WHY CHEVROLET LEADS in Motor Truck Sales



Why do Chevrolet's 1939 truck sales exceed by 36 per cent* the sales of the next truck manufacturer?

There can be but one reason for Chevrolet's predominant leadership in sales. It is

that buyers, in business and in industry, purchase motor trucks as they purchase other capital equipment, on the basis of the maximum return on their investment—and have concluded that the best buy is Chevrolet.

*Latest available R. L. Polk & Company official registration figures through May, 1939.

1st in Value
1st in Economy
1st in Sales

Lower Prices
Lower Operating Costs
Lower Upkeep

CHEVROLET MOTOR DIVISION, General Motors Sales Corporation, DETROIT, MICHIGAN
General Motors Installment Plan—convenient, economical monthly payments. A General Motors Value.

DESIGNED FOR THE LOAD

CHEVROLET

POWERED FOR THE PULL

MASSIVE NEW SUPREMLINE TRUCK STYLING... COUPE-TYPE CABS... VASTLY IMPROVED VISIBILITY • FAMOUS VALVE-IN-HEAD TRUCK ENGINE • POWERFUL HYDRAULIC TRUCK BRAKES (Vacuum-Power Brake Equipment optional on Heavy Duty models at additional cost) • FULL-FLOATING REAR AXLE on Heavy Duty models only (2-Speed Axle optional on Heavy Duty models at additional cost)

It's a SPEEDLINE

END
DISCHARGE
75-105-145



OTHER MIXERS
2 1/2 to 545

Latest Type Speed Mixers!

Fastest, easiest handling, lightest yet huskiest mixers Jaeger has ever built—end discharge trailer type (2 or 4-wheel mountings interchangeable), need 50% less street room. Machine Steel Drum Trucks—many improvements. Low prices. Get Catalog.

THE JAEGER MACHINE CO.
701 Dublin Avenue, Columbus, Ohio

JAEGER

Swing Span Erected Over Canal at Houma

(Continued from page 14)

ters and double 2 x 4 wales with wood block spacers and a bolt tie rod. All concrete was placed by the bottom-dump bucket handled by the stiffleg derrick.

In pouring the 24-foot roadway deck on the swing span the material was handled in the same way. The 6½-inch slab is thickened to 8 inches over the main girders and has a curb 10 inches high battered 1½ inches to 6 inches wide at the top. A 3-foot sidewalk on each side has a 4-inch slab and the sidewalk beam carries the hand rail on the outside.

A double wood truss screed 45 feet long was used for finishing the pavement slab. It was built up with an 8-inch channel as the screed, with pairs of ½-inch bolts welded to the flanges of the channel every 3 feet and carried through the bottom of the wood truss to nuts for adjustment. Truss rods ran from the top of the ends to the bottom at the center with nuts to take up the slack. Ten men were used to operate the screed on the slab.

The concrete used for the structure consisted of Class A and Class AA. Each was approximately a 1:2:4 mix but the gradation of the aggregate made the difference in the specification. The Class AA used for the roadway and all superstructure had a smaller aggregate grading. The slab was cured for 72 hours with wet burlap and then covered with sand and kept wet for an additional 11 days. The hand rail was covered with burlap and wet continuously for the same period. On the curbs and all outside forms the contractor used 2-inch lumber instead of the ¾-inch face lumber for the piers.

The control house on the north bank was built of concrete with simple but attractive architectural treatment. It has steel sash and door frames, plaster walls and a tile floor.

Major Quantities

The major quantities in this swing span bridge include the following:

Roadway excavation.....	1,230	cu. yds.
Structural excavation.....	718	cu. yds.
Sodding.....	1,980	sq. yds.
Concrete paving.....	126.5	sq. yds.
24-inch reinforced concrete pipe.....	380	feet
18-inch corrugated iron pipe.....	33	feet
Class AA concrete.....	187.76	cu. yds.
Class A concrete.....	338.46	cu. yds.
Reinforcing steel.....	65,833	pounds
Structural steel.....	188,127	pounds
Crossed structural timber for fender.....	8,232	MFBM
Crossed timber fender piles.....	3,240	feet
Untreated timber piles.....	4,570	feet
Movable span machinery.....	\$10,000	(lump sum)
Movable span power plant.....	10,500	(lump sum)

Personnel

The contractor for this 136-foot swing span bridge over the Canal at Houma, La., was Robinson & Young of Baton Rouge, La., for whom Glenn Jory was Superintendent. The bid on which the contract was awarded was \$67,631.62. For the Louisiana Highway Commission, S. C. Smith was Resident Engineer. Work was completed on this contract, Project 6407, in July, 1938.

Heavy-Duty Welding And Heating Blowpipe

Many metal-working operations such as forming, straightening, bending, pressing and forging can be effectively and economically performed with the aid of the intense localized heat of an oxy-acetylene flame. To increase the usefulness of the oxy-acetylene flame for such operations, a large-capacity heating blowpipe has been announced by The Linde Air Products Co., 30 E. 42nd St., New York City.

This blowpipe, known as the Oxweld Type W-26 heavy-duty welding blowpipe, is for welding and heating ranges above those which can be handled with

ordinary blowpipes and delivers a tremendous amount of heat to a localized area. Extensions for the welding head are available for extra-heavy work, eliminating the necessity for heat shields. The manufacturer claims that the operator works in comfort, away from the source of heat, and that the blowpipe, even with the extension, is easy to handle because of its balance.

Minnesota Installs First Iron Pavement

The first use of cast-iron pavement in Minnesota is on an experimental stretch laid this summer on Trunk Highway No. 53, south of Eveleth. The pavement is being laid under an award for a concrete pavement for the length of 0.8 mile. The contract included 4,846 cubic yards of sand-gravel material, 11,474 square yards of concrete paving, 1,325 cubic yards of excavation, 152,000 Type A cast iron paving blocks, and 1,000 Type B cast iron paving blocks.

STERLING BALANCED WHEELBARROWS



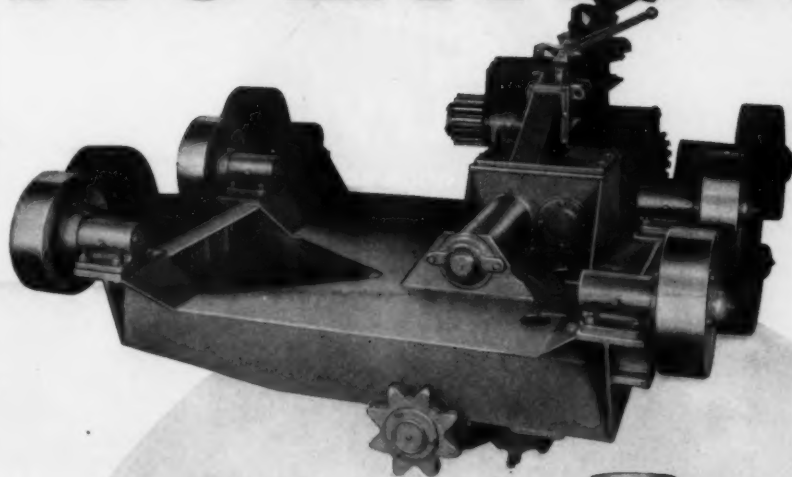
Greater part of
load balanced
over wheel

NO. S-18 CONCRETE BARROW

A COMPLETE LINE OF STERLING
WHEELBARROWS AND CONCRETE CARTS

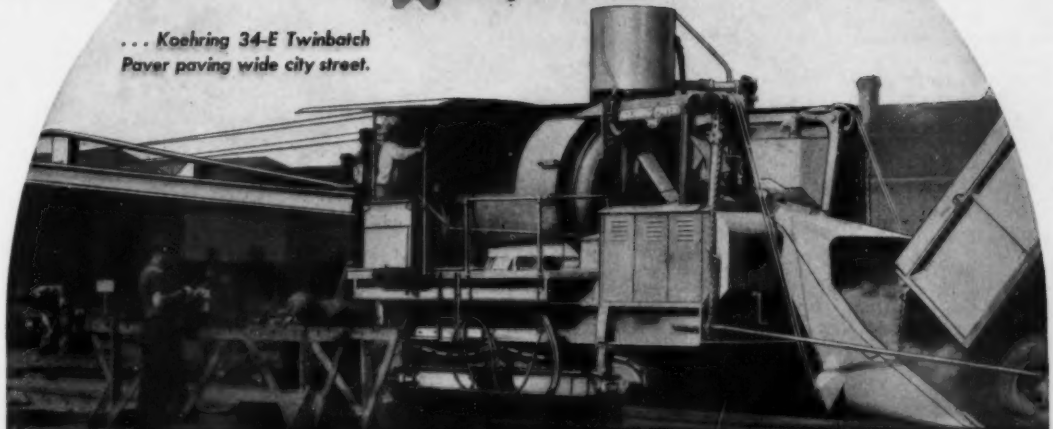
STERLING WHEELBARROW CO., MILWAUKEE, WIS.

KOEHRING



... Koehring 34-E Twinbatch
Paver paving wide city street.

High strength steel
bed-plate, rigidly
supporting drum, re-
ducing vibration, hold-
ing bearings, gears,
shafts in alignment.



Rigid Drum Support...

Koehring Pavers have extra long service life because of the Heavy-Duty Construction design. One outstanding example is the rigid drum support. Constantly moving loads in the drum, as the batch is thoroughly mixed, require a rigid support for the drum. Koehring has provided a steel bed-plate to support the drum, through the drum rollers. It also supports the drum drive, traction drive and traction shaft assembly. All of these units are integral with the steel bed-plate to assure rigidity, reduce vibration, and to hold the bearings, gears and shafts in proper alignment.

THE KOEHRING COMPANY • Milwaukee, Wisconsin



HEAVY-DUTY CONSTRUCTION EQUIPMENT

PICKS and SHOVELS

By O. E. POTTER

The Construction Industry In the World of Tomorrow

If Norman Bel Geddes' dream of the world of 1960, depicted in General Motors' Futurama at the New York World's Fair, anywhere nearly approximates the reality of the future, then the construction industry has busy years ahead, for by those standards much of what has been built for the world of today is fast becoming obsolete and can have little place in the carefully planned streamlined efficient safe and healthful community of tomorrow.

In portraying to the general public the contribution of industry to the present as well as the future, the exhibitors at the Fair have by no means neglected the place of the construction industry.

Steel in the Future

In addition to samples of guard rail, sheet steel piling, wire rope and cable, and many other of its products, the Bethlehem Steel Co. has a panoramic demonstration of the production of steel, an interesting view of the city of tomorrow and the place of steel in its construction, and a set of colored transparencies of today's great structures in which Bethlehem steel was used, including the trestle at Grand Coulee Dam, the sheet steel piling for the cofferdam at Pickwick Dam, the West Side Express Highway in New York City, the towers and superstructure of the Golden Gate Bridge, the Middletown-Portland Bridge at Middletown, Conn., the towers for the Boulder Dam-Los Angeles power line, and the Hackensack River Bridge, on the Pulaski Skyway in New Jersey.

In the United States Steel Co.'s "inside out building" (so-called because the steel girders are exposed on the outside instead of concealed on the inside) is a Hall of the Future, showing the use of steel in the construction of city buildings, on farms, in highways, overpasses and bridges in the world of tomorrow. There we learn that there is 9½ tons of steel in use today for every person in the United States. We can only marvel at the amount which will probably be built into the world of the future.

Wire Rope Plays Its Part

The part played by wire rope and cable is demonstrated by the John S.

Roebbling's Sons Co. which has a very interesting model of the various services performed by wire rope, including an aerial cableway pouring the concrete buttresses of a dam and a working model of a dredge which we wanted to take home and play with in the bath tub.

At the American Chain & Cable Co. exhibit, Hazard Wire Rope Division has a very interesting and educational exhibit of preformed wire rope, showing how this rope is preformed and the various features and advantages of this type of rope in all kinds of services.

The Contribution of Explosives

In the du Pont exhibit, a diorama shows typical quarrying operations in the foreground, at the left a solid ledge of rock, and in the background a highway, a railroad tunnel, and a channel for a ferry boat, all blasted out of solid rock and made possible only by explosives. A panel on the side bears the statement "Nothing made reaches its eventual use without having been affected in some

way by the creative force of explosives."

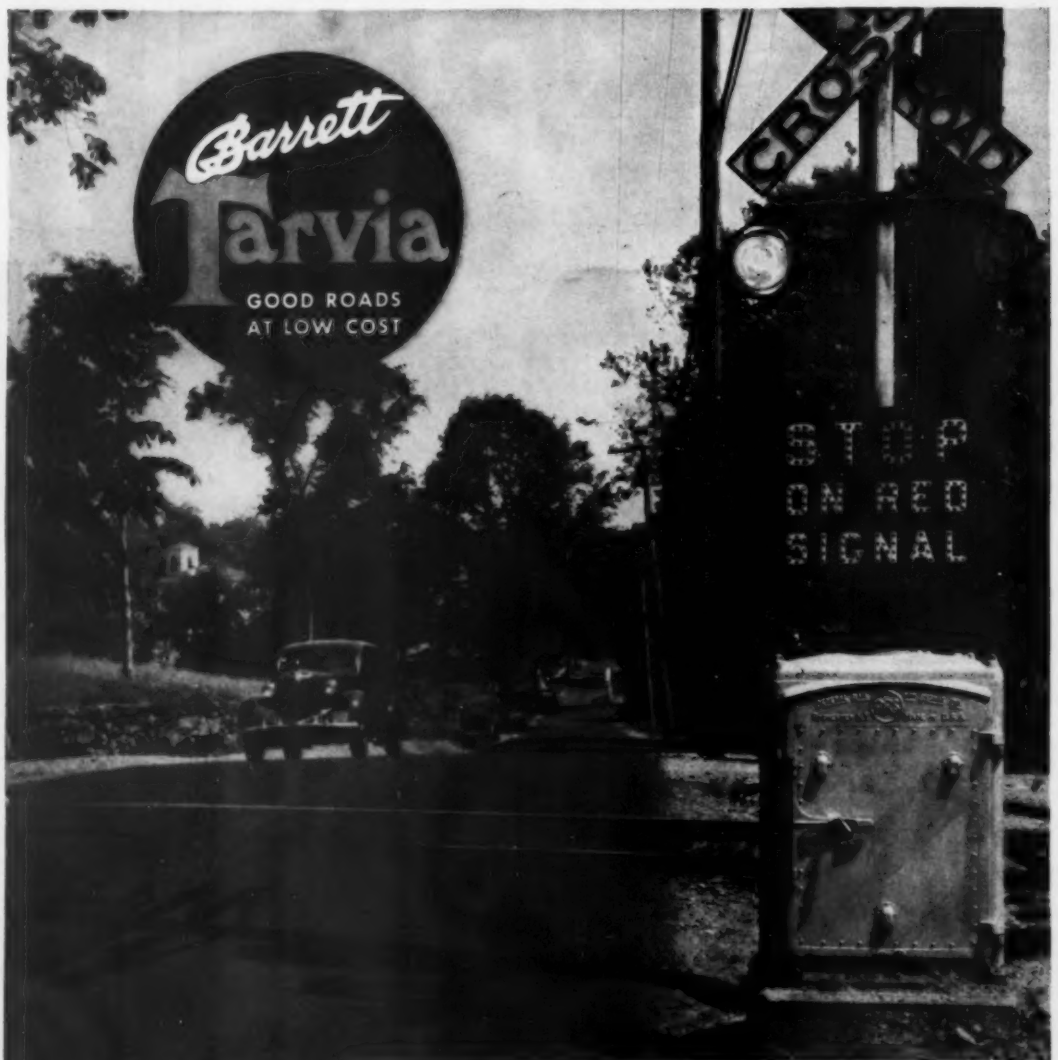
Tires While You Wait

Firestone has concentrated on rubber in the world of today and the visitor to its exhibit can follow through the production of tires from a model of a rubber plantation in Liberia showing how the trees are tapped and the latex gathered and prepared for shipment through an actual production line where tires are made before your very eyes.

Other Impressions at the Fair

The vastness of the Fair and the wealth of information and interest to be found there leaves one slightly dazed, with a mind whirling with new ideas and impressions. We remember, however, an interesting set of pictures in the General Motors diesel engine exhibit, showing the history of highways from the days of El Camino Real in 1836, the Oregon Trail of 1843, the Camel Express across the desert in 1857, the first

horseless carriage in the "get out and get under days," through the adoption of uniform route signs to the modern divided highway with roadside beauty restored. These pictures were furnished by the U. S. Bureau of Public Roads (now the Public Roads Administration) . . . a small boy (probably a contractor of the world of tomorrow) wide-eyed with wonder and fingers itching with desire, standing before the models of a Speed-o-Matic dragline working in a sand and gravel plant and a shovel loading rock in a quarry, at the Link-Belt exhibit . . . a pair of acrobatic roller skaters performing on a 9-foot platform and Timken-roller-bearing-equipped skates with the same precision and accuracy which goes into the manufacture of Timken bearings, according to the voice from the amplifier at the Timken exhibit . . . a thousand people an hour riding on Ford's highway of tomorrow . . . and everywhere indication of the hope and determination of this country that the world of tomorrow will be one of peace and health and comfort and safety.



QUICK STOPS! are safer on
skid-safe **TRACTIONIZED**
TARVIA PAVEMENT

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America's leading manufacturer of coal-tar products **ROOFINGS • TARVIA • CHEMICALS**



New All-Purpose Portable PAINT SPRAYER

Low cost, hand-operated, all-purpose traffic line striping provides uniform coverage, perfect penetration, clean-cut edges. Can also be used for painting bridges, equipment, traffic signs, etc. Ideal for all cities—large or small. Gives year-round service. Speeds up marking jobs. Reduces costs. Also, power driven unit capable of marking 12,000 to 15,000 feet per hour. Write for literature.

MEILI-BLUMBERG CORP.
Box C-2 New Helsinki, Wisconsin





Loading Sandstone and Conglomerate with a 1½-Yard Osgood Shovel on the Verbitsky Brothers Heavy Rock Cut in Pennsylvania

Big Rock Cut in Pa. Made by One Shovel

Verbitsky Brothers Moved Large Yardage in Four Winter Months At Tamaqua, Pa.

(Photo on page 40)

♦ CLOSE to 55,000 cubic yards of sandstone and conglomerate was removed by Verbitsky Brothers of St. Clair, Pa., from a large rock cut on State Route 162 between December, 1937, and March, 1938, at Tamaqua, Penna., eliminating one of the most dangerous road intersections in the state. The cut has a maximum height of 147 feet and is 560 feet long.

The drilling was done with two Cleveland D-R 6 wagon drills supplied with air by two Schramm 360 portable compressors. Oversized rock was drilled with a Cleveland H-11 jackhammer. The average depth of the holes for the wagon drills was about 15 feet and Crusca detachable bits were used for all drilling.

All holes were shot with du Pont Special 40 dynamite, using electric caps. After the small amount of oversize material had been broken down by blockholing, the 1½-yard Osgood power shovel moved in and quickly loaded the blast into five trucks which hauled an average of 1,500 feet to the fill.

This 54,632-cubic yard rock-moving job was handled in quick time by Ver-

bitsky Brothers, contractor of St. Clair, Pa. For the Pennsylvania Department of Highways Frank Farne was Resident Engineer.

Lidgerwood Vice President

With Company Fifty Years

Last month Jed S. Foster, Vice President and Chief Engineer of the Lidgerwood Mfg. Co., Elizabeth, N. J., was guest of honor at a dinner celebrating 50 years of service with the company.

Well-known in this country and abroad for his engineering activities, Mr. Foster first became prominently associated with large engineering projects during the construction of the Panama Canal in 1907. His latest achievement is the design and construction of the heavy-duty overhead high-speed cableway systems which will be used to handle the concrete for Shasta Dam in California. Mr. Foster also designed the equipment used at Boulder Dam, including the 150-ton capacity permanent cableway.

Acting on behalf of John H. Lidgerwood, President, L. D. Tenerelli presented Mr. Foster with a gold medallion inscribed "Fifty Years of Meritorious Service—1889 to 1939—Lidgerwood Mfg. Co."

PILE HAMMERS and EXTRACTORS HOISTS-DERRICKS WHIRLERS

Special Equipment
Movable Bridge Machinery

Write for descriptive catalogs.

McKIERNAN-TERRY CORP.
19 Park Row, New York

Distributors in Principal Cities

SHUNK



D-K SPREADER AND FINISHING MACHINE AND BITUMINOUS PAVER

- Lays any type mix, hot or cold
- Lays any thickness desired
- Levels without forms
- Capacity 1000 to 1200 tons per day
- Lays variable widths from 6' to 10'
- Lays to grade

No high or low spots when re-surfacing with a D-K Spreader

Spreads and automatically grades in one operation. Finishes without forms or manual labor.

LAYS SMOOTHER ROADS, FASTER AND CHEAPER

Inquiries solicited—Circulars furnished upon request. Address Dept. CE

THE SHUNK MFG. COMPANY
BUCYRUS, OHIO, U. S. A.

NEW

BUCYRUS-MONIGHAN

9-W

**WALKING
DRAGLINE**

**BUCYRUS
MONIGHAN**

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN

Owned by J. A. Telling & Sons and operating near Gothenburg, Nebraska, this New Bucyrus-Monighan 9-W uses a 160-foot boom.



The Heltzel Concrete Bucket

Controlled-Discharge Steel Concrete Bucket

A general-duty concrete bucket which has been engineered to be grout tight and always discharge the concrete from the centerline is described by Heltzel Steel Form & Iron Co., Warren, Ohio, in its new Bulletin T-29-CB. The discharge gate may be set for a narrow slot when pouring grout or a moderate opening when pouring narrow forms, wider for normal forms and wide open for pouring mass concrete. The steep hopper slopes and gate design make the bucket self-cleaning for either wet or dry mixes. The low overall height gives maximum clearance for charging and the rigid all-steel construction with a heavy steel channel base ring gives maximum strength without excess weight.

Special features mentioned by the manufacturer are the heavy reinforced bail, the heavy steel channel buffer ring at the top, a long control handle, a self-locking gate toggle, a heavy steel plate gear guard, Neoprene gasketed gates to make them grout tight, and roller bearing trunnions.

Further information and a copy of the bulletin may be secured by writing direct to Heltzel and referring to this text.

Blueprint Reading

For Welding Jobs

A new book, "Simple Blueprint Reading with Particular Reference to Welding and Welding Symbols," has recently been announced by the Lincoln Electric Co., Cleveland, Ohio. While compiled and published primarily for welders, this book contains information of value to anyone concerned with mechanical construction, as its object is to provide information and instruction in the reading of blueprints and drawings.

Copies of this book may be secured direct from the Lincoln Electric Co. Price: 50 cents a copy.

Want information? Write the Editor.



Manufactured by

NETHERINGTON & BERNER Inc.
INDIANAPOLIS, IND.

Simple Traffic Lines Adopted in New York

(Continued from page 17)

is in a position to use his own judgment and may cross the line to pass if it is safe to do so. But if the solid line is on the driver's side, the double line constitutes an absolute prohibition against crossing and a motorist who does so is not only inviting a serious accident but is violating the law and is liable to fine or imprisonment or both.

In some locations, sight distances are short in both directions and in such cases double solid lines are used, and cars proceeding in both directions are prohibited from passing.

Double Line Used Judiciously

Because of the importance of the double line, it is used only where absolutely necessary and its length kept as short as possible. It has been used only after careful study of the location, and a motorist who encounters a double line in New York State may be sure that he is at a spot where, in the judgment of experienced highway engineers, his only assurance of safety lies in keeping to the right of the solid line on his side.

There are many locations where pavements are narrowed, or where considerations of safety dictate that the number of traffic lanes be reduced. In such locations traffic is shunted to the right by means of a diagonal double line and passing on either side is prohibited by the solid double line until traffic has adjusted itself to the narrower pavement.

Simplicity Important

In preparing these standards for pavement markings, every effort was made to keep them as simple as possible, in order that motorists may easily and quickly understand their meanings. During the summer, all important routes on the New York State system were so marked, with the confident expectation that if motorists form the habit of following the instructions furnished by these markings, the number of motor vehicle accidents in New York State will be greatly reduced.

Blades and Cutting Edges

Shunk blades and cutting edges for road graders, maintainers, scrapers, fresnoes, backfillers, bulldozers, trail-builders, dirt-movers, terracers, snow plows and moldboards, made from special refined high-carbon plow steel, are the result of over 85 years of experience in the manufacture of this type of equipment. In addition to blades for every type of machine on the market, all types of special blades are also available.

Complete information on Shunk blades and cutting edges is contained in literature which may be secured by interested contractors and state and county highway engineers direct from the

**PORTABILITY
and
CAPACITY
COMBINED
IN THE NEW
MODEL P-A
PORTABLE
MIXING PLANT**

Write for
Particulars
Bulletin T-260

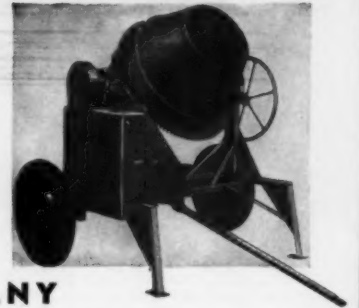
Shunk Mfg. Co., Bucyrus, Ohio, by men-

tioning this item and magazine.

A New Mixer Built for Action

This new 3 1/2 E.D. (End Dump) Lansing Trailer Mixer is faster, more compact and easier handled. Its overall length is only 57" and entire width 68", with a height of 65".

It has a convenient shoveling height of only 42 1/2", with a 31-inch drum. Sturdy 1 7/8" axles, and 26" wheels with pneumatic tires. Weighs only 950 lbs. Write or wire NOW for complete information.



LANSING COMPANY

LANSING, MICHIGAN

CHICAGO
KANSAS CITY

NEW YORK

BOSTON

PHILADELPHIA

MINNEAPOLIS

LOS ANGELES

ALL TRAILERS are NOT ALIKE!



IF YOU are to be completely satisfied in the operation and service of the trailer you buy, you should inspect its mechanical construction carefully. Are the beams strong enough to carry the rated capacity without sagging, after several months' service? Does it have bronze bushings on radius rods, brake cross-shafts, and all other points requiring lubrication? Does it have oversized, tapered roller bearings in all wheels? Does it include complete equipment? These are just a few important details to look for in your next trailer.

The new 6-wheel, 20-ton JAHN trailer shown here is typical of the entire

line of QUALITY trailers now being built. This new heavy-duty model is convertible to a semi-trailer without any mechanical changes, by simply removing the front dolly assembly, (king pin fits any standard semi-automatic fifth wheel). Other important features include deep wide flange main beams, numerous cross members and gusset plates, spring mounted front dolly, internal expanding brakes and the latest development in positive brake equalization.

Before you buy any trailer, check the exclusive advantages found only in JAHN SUPER-BUILT TRAILERS. Write for details.

C. R. JAHN CO. 1347 W. 37th PLACE, Chicago, Ill.

"COME TO TRAILER HEADQUARTERS"

STANDARD FOR HALF A CENTURY



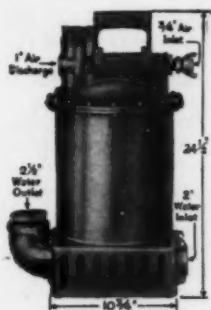
3 AXEL TANDEM

**Buffalo Springfield
ROLLERS**

TANDEM MODELS
From 2 to 21 tons3 WHEEL MODELS
From 5 to 14 TonsGASOLINE OR DIESEL
POWERED

Full Details
Sent upon request

The Buffalo-Springfield Roller Co.
Springfield, Ohio, U. S. A.



The New G-P Sump Pump

New Dewatering Pump For Air Operation

A new air-operated ejector pump in which the compressed air flows through a 3/4-inch air inlet, creating a vacuum which sucks water through the 2-inch water inlet until a float valve in the drum shuts off the air discharge, then forces air into the drum instead of out the 1-inch air discharge, thus creating a pressure which forces the water out of the 2 1/2-inch water outlet, has been announced by Chicago Pneumatic Tool Co., 6 East 44th St., New York City. This Type No. 7 CP sludge pump gives a pulsating flow much the same as a hand pump, has high lift capacity and low air consumption. The manufacturer states that it will handle up to 15 per cent of solids and handle water containing sand or rock drill cuttings without causing rapid wear. The capacities of the pump, which weighs only 95 pounds and therefore is readily portable, are 65 gpm at a 50-foot head down to 20 gpm at a 200-foot head. The pump is particularly applicable for use in unwatering cofferdams, caissons, sumps and pits and on many other construction projects. Bulletin SP-1998, which may be secured from Chicago Pneumatic, describes this pump in detail.

Correction in Road Mileage

In the July issue of CONTRACTORS AND ENGINEERS MONTHLY there appeared a brief item on highway maintenance in the state of Washington, giving the mileages maintained by the various highway units in the state.

We have just received revised figures on this mileages, based on the results of the Highway Planning Survey, as follows:

Highways	Miles
Primary state highways	3,682
Secondary state highways	2,226
Federal reservations	3,209
County roads	39,527
City streets	5,549

While the figure of 23,767 miles of county roads given in the item is correct for the number of miles of road maintained by the counties, the actual mileage under county jurisdiction is 39,527.

The percentages of the total street and highway system are:

	Per Cent
State highways	10.9
Federal reservations	5.9
County roads	72.9
City streets	10.3

Stationary Compressors For Construction Service

A new 16-page catalog has recently been issued by Schramm, Inc., West Chester, Pa., presenting its complete

line of Utility stationary air compressors for industrial and construction service. The sizes range from 85 to 600 cubic feet capacity, with an assortment of assemblies ranging from a bare compressor unit to complete air plants with electric motor, air receiver and all fit-

tings, ready for operation. The drives are either V-belt or a compact built-in direct motor drive. Bulletin 3907-CY gives operating data, detailed specifications and pictorial design features. Copies of this catalog will be sent to readers on request.

Mall GEARED HEAD CONCRETE VIBRATOR



for dams, locks, piers and other heavy types of construction

This powerful, high speed electric vibrator delivers the maximum vibration for the hardest service. It can be used for average size wall jobs encountered in heavy construction work in addition to placing mass concrete. It is light in weight, portable and ideal for one man operation. Fast, complete compaction without honeycomb is assured with this unit. Use one on your next job for strong durable concrete and large savings in labor and material. Investigate the complete MALL line of gasoline and electric vibrators—no cost or obligation.

MALL TOOL COMPANY

7743 South Chicago Avenue Chicago, Illinois
OFFICES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

Placing large masses of concrete—speed 7000 r.p.m.

A BRAND-NEW MEMBER BROADENS THE LINE OF FORD V-8 TRUCKS

THE 3/4 TONNER

122-inch wheelbase—60 or 85 horsepower V-8 engine

Illustrated is the new 3/4-ton Express. Other body types are Stake or Platform, Panel, Chassis with Cab, Chassis with Windshield, and Drive-away Chassis.

The new Ford V-8 3/4-ton Truck brings to the hauler of lighter loads a better opportunity than ever to choose a unit exactly fitted to the needs of his job in power, size and body type.

The new truck is low in price, with exceptionally large body dimensions that will appeal to any one whose loads are in the 3/4-ton range.

It is sturdy, carefully designed and



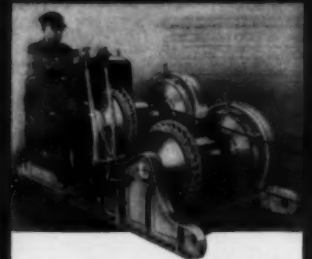
well built. All 3/4 Tonners have full-floating rear axles. Ask any Ford dealer to arrange a free "on-the-job" test for you.

The Ford V-8 line now includes Commercial Cars, 3/4 Tonners, One Tonners, Regulars, and Cab-Over-Engine models, 48 body and chassis types, 3 V-8 engines, 6 wheelbases and a wide selection of optional equipment.

FORD V-8 TRUCKS

FORD MOTOR COMPANY, BUILDERS OF FORD V-8 AND MERCURY CARS, FORD TRUCKS, COMMERCIAL CARS, STATION WAGONS AND TRANSIT BUSES

LATEST IN HOISTS



30 to 50 H. P. JAEGER HOISTS NOW OFFER

- Touch Control thru Giant Expanding Frictions or Clutches.
- Timken Self-Aligning Bearings.
- Combined Side Frames and Base, All-Steel, Lighter, Stronger.
- Self-Starters, up to 8 Cyl. Power, many Jaeger improvements—all at ASTONISHINGLY LOW PRICES!

OTHER SIZES 10 TO 100 H.P.—Most modern hoists on market—single, double, three drums, gas or electric. Send for Catalog.

THE JAEGER MACHINE CO.
701 Dublin Ave. Columbus, Ohio

JAEGER



C. & E. M. Photo
Mitty Bros. Used This Thirty Tractor to Carry a 4-Inch Pipe Jumbo with Four Drifters for Heavy Work Along the Merced Canyon Road

Rock Walls and Masonry Reinforce Calif. Highway

(Continued from page 2)

structing 20-foot x 4-inch oil-treated rock surfacing.

Rock Embankments

The rougher of the two methods of preventing further scour of the roadway section is the rock embankment. This type has been used where the embankment need not be built up to shoulder grade and usually stops about 6 feet below that elevation. A toe trench about 12 feet wide is prepared either by the dragline if the material will warrant or by blasting if in rock. This is used by the heavy trucks in placing the rock by end dumping. The slope of the embankment is $1\frac{1}{4}$ to 1 on both sides and for security the lower 3 feet of the rock is grouted. Above the embankment selected material of a particularly stable nature is used up to grade. The rock used is of such size that not less than 50 per cent has a minimum volume of 9 cubic feet and no rock is less than $\frac{1}{2}$ cubic foot.

For grouting the toe of the embankment the contractor has developed a simple and effective plant. A Jaeger 2-bag mixer with side discharge is run along the bank above the embankment and the grout run into place down a 25-foot semi-circular chute. The mixer is towed by an old chain-drive Mack truck which carries the cement and a tool box. The aggregates are batched by wheelbarrow from aggregate piles spotted about 30 feet apart along the shoulder. A crew of eight men comprise the outfit for grouting.

Rubble Masonry

The rubble-masonry sections are brought to grade and topped with a parapet wall for the safety of traffic, although a few are being constructed as

toe walls and are not more than 10 feet in height. The selection of rock for both the embankments and the rubble masonry was a serious problem on this job. Much of the ledge rock appeared to be hard and suitable but some of it air slaked and other material had all the markings of good hard rock but when struck with a pick or hammer crumbled easily. The bases of the rubble walls were either blasted out of solid rock or the rock slopes cleaned thoroughly. In the latter case where it did not seem advisable to blast the slopes $1\frac{1}{4}$ x 12-inch round dowels were grouted into holes in the solid smooth rock to hold the larger base rock. There was no limit for the maximum size of the rock for the rubble masonry and $\frac{3}{4}$ cubic foot was the minimum size, although some smaller material was used for chinking. The larger rocks were set with truck cranes and the balance by hand, using 2:1 mortar. The outside slope for the walls is 1 on 12 and the inside has a slope that will give a wall always one half as thick as the height.

The fill behind the walls was dumped from the trucks, bulldozed in 12-inch layers, and then tamped with sheepfoot rollers. At times, to facilitate the work, roads were built on the outside of the walls for the truck cranes which picked up the rocks dumped at the inside of the wall. These roads were usually the spoil banks from the excavation for the foundations of the walls, or where there had been a line change in the road itself. The use of this work road was an

advantage as it left the upper one-way road open for hauling trucks and the regular controlled traffic using the highway. After some of the work roads had fulfilled their period of usefulness for construction they were used as detours or by-pass roads for regular traffic.

At one section it was impossible to find a satisfactory foundation for the rubble wall between two large hard sections of ledge. To support the needed rubble wall a 26-foot span reinforced-concrete beam 4 feet wide and 5 feet high was cast between the two ledges and the wall carried on it with a rock back-fill.

Rock Excavation

The large amount of rock excavation on the job required a full complement of drilling equipment. The contractor, well-known for his rock work, used a very complete rock-drilling outfit as will be noted in the list of his equipment below. One piece deserves particular mention, a Caterpillar Thirty tractor

carrying a jumbo of 4-inch pipe on one side with four arms so that two drifters could be used at one time for heavy drilling. At the time one I-R drifter was in use with 18-foot steel and a Gardner-Denver 360 portable compressor.

Large sections of the old rock faces were removed along the right-of-way in order to regain a clear two-lane roadway. Where the river needed added channel, the roadway was cut further into the ledges, but where the road needed protection from further inroads of flood waters the rock embankments or rubble walls were used.

Equipment and Quantities

Strung out over 16 miles of highway the contractor's equipment did not seem adequate but every piece was doing its bit to push the job to completion. For this reason we have prepared a list of the equipment instead of trying to show the work being performed by each indi-

(Concluded on next page)



YOU WILL REVISE UPWARD
YOUR OPINION OF WHAT
CONSTITUTES EFFICIENT LO-
COMOTIVE CRANE SERVICE

WHEN YOU CHECK THE
PERFORMANCE OF THE

Sensational New
AMERICAN
40 and 50 ton CRANES

STEEL AND GASOLINE

Experienced plant executives are astounded at the Phenomenal Capacity, Speed and Ruggedness of these great cranes.

If you are using old style steam cranes you can buy New AMERICAN 40 and 50 Ton Locomotive Cranes out of SAVINGS.

If that sounds strong, say "Show me" and we will furnish facts and figures.

AMERICAN HOIST & DERRICK CO.

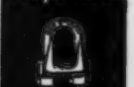
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THE SAFE FASTENING FOR WIRE ROPE

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**Bigger
Payloads?**

You get
em — with Heil
DIG-N-CARRY
Scrapers



The famous Heil Dig-N-Carry Hydraulic Scraper helps make dirt moving pay bigger profits. It stands up to see jobs through on time... produces clean-cut work that boosts your reputation. Regardless of soil conditions, if a tractor can pull through, Heil Dig-N-Carry keeps

earth boiling into the bowl. It digs, loads, hauls, dumps. The guaranteed hydraulic system provides safe, speedy, finger-tip control of every operation. Go out after more "pay-dirt" with the Heil Dig-N-Carry Scrapers. Write for free, colorful bulletin.

**THE STRONGEST
GEARED
POWER
FOR ITS
WEIGHT
IN THE
WORLD**

BEEBE BROS.
SEATTLE, U.S.A.
COMPACT—POWERFUL—SAFE
"For use where power is not practical or available"
Manufactured in 2, 5 and 15-Ton Sizes.
For capacity comparison, $\frac{1}{2}$ " cable used:
2-Ton "Lightweight" 75 ft.
5-Ton "General Utility" 250 ft.
15-Ton Triple-Geared "Special" 1200 ft.
Patent instant gear change and positive
internal brake that never fails, and will
lock load.
Gear Ratios Weight Seattle
2-Ton 4 & 22 to 1 60 lb. \$ 50
5-Ton 4 & 24 to 1 110 lb. \$ 75
15-Ton 4, 19 & 100 to 1 600 lb. \$250

BEEBE BROS.
3724 6th Ave., So. SEATTLE, WASH.
Warehouse stocks for dealers' supply: Seattle—
Chicago—Brooklyn—Houston. Complete literature
and List of Dealers in Principal U. S.
Cities and Foreign Countries Gladly Mailed.

Head Scrapers • Bodies •
Hoists • Tanks • Snow Plows
• Bottle Washers • Dehydrators
• Oil Burners • Water Systems

MILWAUKEE
WISCONSIN

THE HEIL CO.

HILLSIDE
NEW JERSEY



C. & E. M. Photo
The 35-Foot Reinforced Concrete Beam
Carrying a Rubble-Masonry Wall and
Roadway

Repairing Canyon Road Damaged by Big Flood

(Continued from preceding page)

vidual unit at the time we visited the work.

- 1 Koehring 801 shovel with 2-yard Amaco dipper and Duda diesel engine
- 1 1½-yard Koehring shovel
- 1 1½-yard Koehring dragline
- 1 ¾-yard Koehring crane
- 1 P & H truck crane
- 1 McCaffrey truck crane
- 3 Caterpillar Seventy-Fives with LeTourneau bulldozers
- 3 Caterpillar Thirties
- 1 ½-yard Jaeger concrete mixer
- 3 1-bag mortar mixers
- 2 Ingersoll-Rand 210-cubic foot portable compressors
- 2 Gardner-Debenport 360-foot portable compressors
- 1 Ingersoll-Rand 160-foot portable compressor
- 1 Ingersoll-Rand 120-foot portable compressor
- 1 Gardner-Debenport drill sharpener and furnace
- 1 Austin 12-foot motor grader
- 1 12-yard Carryall
- 2 Electric welding outfits
- 1 International pick-up truck
- 1 International 2-ton flat-bed truck
- 1 Chevrolet 1½-ton flat-bed truck
- 3 4-yard dump trucks, various makes
- 14 7-yard dump trucks, various makes
- 1 Scarifier
- 2 McCaffrey sheepsfoot rollers
- 1 6-inch pump
- 2 3-inch pumps
- 3 1½-inch pumps
- 18 Jackhammers
- 12 Water drills

The major quantities on this contract are as follows:

Clearing and grubbing.....	657 stations
Water	5,650,000 gallons
Excavation, unclassified, roadway.....	222,630 cu. yds.
Excavation, structure	17,323 cu. yds.
Excavation, ditch.....	3,000 cu. yds.
Excavation, channel.....	7,500 cu. yds.
Excavation, trench.....	35,580 cu. yds.
Overhaul.....	12,000,000 sta.-yds.
Rock embankment.....	93,740 cu. yds.
Removal concrete and rubble masonry.....	70 cu. yds.
Finishing roadway.....	657 stations
Crushed gravel and stone.....	18,750 tons
Reworking existing surface.....	616 stations
Liquid asphalt, SC-1A.....	275 tons
Screenings, penetration treatment.....	1,050 tons
Portland cement concrete, Class A.....	325 cu. yds.
Reinforcing steel, bar.....	30,000 pounds
Rubble masonry.....	9,400 cu. yds.
Dry rubble.....	930 cu. yds.
Masonry parapet.....	950 cu. yds.
Light riprap.....	900 cu. yds.
Corrugated metal pipe, 18-inch.....	942 feet
Corrugated metal pipe, 24-inch.....	1,960 feet
Corrugated metal pipe, 30-inch.....	54 feet
Traffic control car.....	35,000 miles

Rock-Crushing Plant

Located at about the mid-point of the job is the rock-crushing plant of the contractor. Suitable rock is hauled to the plant by trucks from the quarry located across the road from the plant. There are two feeding bins with railroad rail grizzlies spaced 12 inches on centers. The rock passing these falls onto a pair of reciprocating feeders leading to a 4-inch grizzly. Material passing this falls onto the conveyor and the oversize slides down into the Cedar Rapids jaw crusher below. The crusher-run material from this falls through onto the same belt conveyor and is carried across to the rotary screen which removes all 1-inch material and smaller, the oversize going to a 2-foot Symons cone crusher with the crushed material running down to a bucket elevator that raises it to the screen. The entire plant is electrically driven.

Operation of the Job

The remarkable part of this job is that it was operated 5½ days a week with traffic using the road, or what had been left of it, throughout the entire 24 hours of every day. This statement may not be quite true as traffic was held at the control gates where large signs were displayed showing the times that the control car went through with the various groups. The control car was an International pick-up truck, listed in the contract as the 35,000-mile traffic control car, and had a sign on the tailgate reading as follows:

PILOT CAR

Follow but do NOT Pass

The line of cars kept close to the control car as it weaved in and out first against the wall of rock on the inside of the road and then out to the edge. It is the rule of the road on this job that the loaded trucks have the right-of-way and that means that they always keep to the inside of the road and let the lighter traffic run on the edge where the face of the bank is still vertical in many places with a field of boulders below.

The schedule for the control car was provided in the contract and also the stipulation that the job was to shut down Saturday noon and not open up until Monday morning. The reason for this is that the highway leads to a popular week-end resort where skiing is the great sport during the winter and picnicking during the entire year. This is one of the places where you can sit on the grass and cool the bottles of beer in a patch of snow a few feet away. Therefore the rule of the road on week-ends was reversed and the visitors had the right-of-way.

During the winter of 1938-39 the contractor worked 24 hours a day, running three 8-hour shifts on the shovels to get the road opened as a 2-way highway and also the same shifts on the masonry walls as they were controlling factors in opening several sections of the highway. During the spring of 1939 the shovels worked 8 a.m. to 4:30 p.m. and 6:30 p.m. to 3 a.m. The exceptionally dry winter was a boon to the contractor.

The borrow for the untreated crushed gravel base is being taken from the river where there is more than enough gravel to pave that mythical highway from Maine to California.

Personnel

The contract for the repairs to the Merced Canyon highway for a distance of 12.43 miles in an overall distance of 16.58 miles was awarded to Mittry Bros. of Los Angeles, Calif., on August 22, 1938, on its low bid of \$509,744.75. O. K. Mittry is in charge of the work for the contractor. For the California Division of Highways, A. N. Lund is Resident Engineer, under R. E. Pierce, District Engineer. The contract is known as Federal-Aid Project ER-9 California A1 Unit 2.

Material Spreaders

Burch material spreaders, which spread stone and other materials from 1

to 18 inches in depth and are available in six sizes, from 5 feet 6 inches to 10 feet long, are described and illustrated in Bulletin S.S. No. 11, issued by the Burch Corp., Crestline, Ohio. Adjustable gates are built in each end of the

machine to permit a flow of material from the ends when desired, and long wings permit laying material accurately up to a maximum width of 16 feet.

Copies of this bulletin may be secured direct from the manufacturer.

WILLIAMS Buckets

Built by Wellman

Built to Last—
and Move
Dirt Fast

Profits from a digging or material handling job often depend on how fast the crane operator can move dirt and materials. That's when Williams Buckets prove their advantages. Their tremendous digging power and ability to stand up do not rely on cumbersome weight and massive construction. No "dead-head" metal rides in Williams Buckets—you carry maximum yardage in every swing, utilizing the full capacity and range of your crane to move pay-dirt—not inert metal.

Send for free bulletin covering the Williams line of Power-Arm, Multiple-Rope, Power-Wheel, Hook-On and Dragline Buckets. Distributors located in all parts of the country for prompt field service.

THE WELLMAN ENGINEERING CO.

7012 CENTRAL AVENUE
CLEVELAND, OHIO



Help Cranes Do Their Best Work!

* Exclusive with HERCULES DUMP UNITS

- Center-Lift, Super-Power Hydraulic Hoist.
- "Tire and Tool Pack" Dump Bodies—a spacious weather and theft-proof compartment built-in under body.
- "Eze-Reach" Tail Gate Control Lever—mounted on hoist frame within easy reach at all times.
- "Button-ease" control, on dash, operates Power Take-Off.
- "Button-ease" control, on floor, operates Hydraulic Hoist—OUT OF THE WAY BUT HANDY.

*NOT ONE of these features are offered by any other manufacturer—with Hercules you get them all.



Write for
literature

HERCULES STEEL PRODUCTS CO.
GALION, OHIO

ASPHALT PLANTS

HOT & COLD MIX—ANY CAPACITY
PORTABLE OR STATIONARY
STEAM — ELECTRIC OR DIESEL



THE SIMPLICITY
SYSTEM COMPANY

CHATTANOOGA, TENNESSEE





The Double Return-Tube Heating System of the Hauck Speed-Master

A New Kettle for Tar and Asphalt

The new Speed-Master kettle, made by the Hauck Mfg. Co., 116-126 Tenth St., Brooklyn, N. Y., employs the immersion tube principle of heating asphalt, tar and pitch which, because it puts all the heat to work in the material, greatly reduces melting time and assures a saving in fuel. It is equipped with a double return-tube heating system made of special heavy-welded steel tubing and a flame burner where moving a single lever instantly changes the size of the flame and quantity of heat, thereby controlling the temperature of the bituminous material.

The kettle shell is of 16-gage blue-annealed steel sheet with the seams arc welded and the sides, bottom and ends insulated by hard-pressed asbestos board encased by heavy steel sheathing. Safety features stressed by the manufacturer are the position of the burner on the outside of the kettle where its operation can be easily observed by the operator and the elimination of the possibility of fire starting in the heating tubes. It has a light but strong reinforced open tubular steel chassis frame, available in either skid or trailer mounting, and can be locked up for the night to prevent theft of burner or parts.

Complete details are contained in a catalog describing and illustrating this and other Hauck oil-burning equipment.

Improved Road Ripper

In the Killefer improved revolving ripper, made by the Killefer Mfg. Corp., 5525 Downey Road, Los Angeles, Calif., the standards are mounted on a heavy shaft which rotates on its four lathe-turned journals in bearings mounted on frame members which extend from the front to the rear of the machine. This shaft forms a strong cross member

across the rear of the frame and is well supported in the center.

The tool head, which revolves completely, rolls like a barrel, forward or back. As the standards rotate, they pass between the heavy frame members, and trash can not stay between them, according to the manufacturer. At a pull of the single control rope, without stopping or backing the machine, the tool head revolves. The points leave the ground and roll over obstructions as the machine moves forward. The tool head will stop automatically, half-way over, with the points above the frame. In this position the machine is ready for transporting. The points roll forward again, at the next pull of the control rope, to resume digging.

The various models of this self-cleaning completely revolving ripper are described and illustrated in a new bulletin which may be secured by those interested direct from the manufacturer.

A Motor-Driven Broom Propelled By Truck

A new power rotary sweeper has been developed by Carl H. Frink, Clayton, New York, manufacturer of Frink Sno-Plows, for motor trucks and tractors, and is being marketed under the trade name "Roto-Broom." This sweeper attaches to the front end of any motor truck and may be used by town, county and state highway departments, road contractors and street and highway oiling contractors, for base cleaning before priming or sweeping ahead of sealing.

The broom assembly is readily reversible for sweeping either to the right or to the left, or may be locked in the central position to sweep straight ahead. A flexible hook-up to the motor truck permits oscillation of the broom assembly to follow closely any unevenness in the street or other surface. The height of the brush is controlled by a convenient adjustment between the broom assembly and the chassis assembly, which compensates also for wear of the brush filler.

Generous-sized caster wheels with double-tube pneumatic tires carry the weight of the broom and facilitate guiding it in any direction. The broom is powered by a 4-hp air-cooled Wisconsin engine coupled to the broom through an enclosed worm and gear speed reducer, sprockets and roller chain. The speed of the rotating brush is approximately 102 rpm and it cleans a space about 7 feet

wide. The brush core is refillable.

Provision is made for directing a sheet of finely atomized water down in front of the brush when the broom is being operated for cleaning city streets. Water pressure is provided by a V-belt-driven centrifugal pump which draws water through a flexible hose from a barrel or other suitable receptacle in the dump body of the truck.

When not in use, the broom is raised for carrying by means of the regular Frink Sno-Plow truck attachment mounted on the front end of the truck. Trucks already equipped with this attachment for use with Frink plows may obtain the Roto-Broom without this attachment and therefore effect a saving in the purchase price.

Illustrated Catalog On Heavy-Duty Trailers

The line of La Crosse heavy-duty trailers for transporting heavy machinery and materials is described and illustrated in a catalog issued by the La Crosse Trailer & Equipment Co., La Crosse, Wis. These trailers are available in a large variety of sizes and models, with regular, pneumatic or solid tires.

Contractors and state and county highway engineers may secure copies of this catalog direct from the manufacturer who will also be glad to make recommendations for the type of trailer best suited to any special transportation problems.

for Safety Demand these 4 Features

You Get Them in a Simplex Ball Bearing Screw Jack

1. Self-leveling, drop forged, heat-treated cap—floats on a chrome-molybdenum ball which reduces friction 88%—prevents jack from "creeping out" from under load.
2. Forged head steel screw—recessed at top—holds hardened steel plate in which the molybdenum ball is nested.
3. Peep hole in the side informs operator how far to extend the screw with safety. Eliminates measuring.
4. Malleable iron base or housing, in all popular sizes, resists fracture and breakage.

Simplex Screw Jacks are one of the 217 models of safer, sturdier, more efficient jacks in the complete Simplex Line—quality materials and workmanship in every type and size, quality that has constantly improved for 40 years.

Stocked by your supply house.

TEMPLETON, KENLY & CO.,

Established 1899

CHICAGO, ILLINOIS

SIMPLEX
GOLD MEDAL AWARD SAFETY JACKS



HERE'S "A LOT OF DIRT"

If you ever hear a "lot of dirt" about Galion graders rest assured that it will be ahead of the blade as is illustrated in these photographs.

Galion graders, motor patrol and pull type alike, will move a lot of material in a day's time. They are built to do the heaviest kind of grading work and have many special features to assure ease of operation and A-1 performance.

The big HEAVY DUTY model is shown above, next is the Master model working out in Washington, and below is the No. 210 pull grader blade-deep in work.

Let us tell you more about Galion graders and their grading ability.



THE GALION IRON WORKS & MFG. CO.

Galion

Ohio

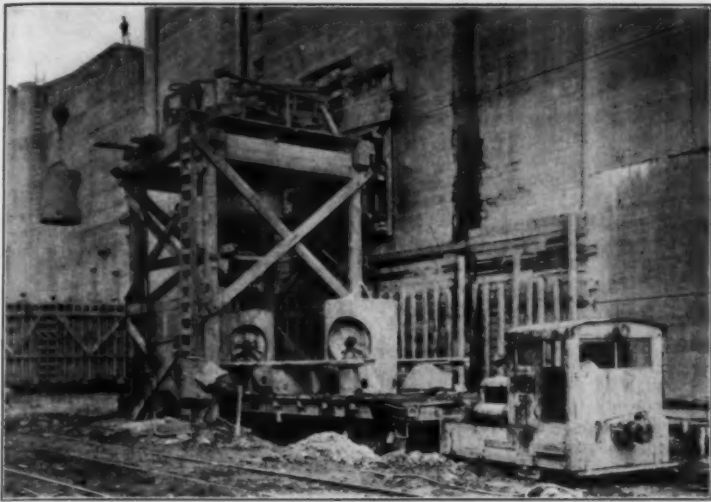


● Heltzel heavy duty reinforced steel road forms—guaranteed durability and longer life under all conditions. Catalog S-19-F.

HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO, U.S.A.

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BUILDS IT BETTER

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CURB AND GUTTER FORMS
SIDEWALK FORMS
SEWER AND TUNNEL FORMS
CONCRETE BUCKETS
SUBGRADE TESTERS
SUBGRADE PLANERS
TOOL BOXES
FINISHING TOOLS FOR CONCRETE ROADS



Moving Concrete for the Big Locks on the Warrior River at Tuscaloosa, Ala.

Handling Concrete At Tuscaloosa Locks

The Hardaway Contracting Co. of Columbus, Ga., has used a Brookville locomotive powered by an International PD-40 diesel engine to facilitate the movement of some 200,000 yards of concrete required to build the big locks on the Warrior River at Tuscaloosa, Ala.

Concrete was mixed in two 2-yard mixers above and a short distance away from the locks. It was then moved down through a conduit to the 10-yard hopper shown in the illustration. From the hopper the concrete was delivered to two 3-yard Dravo buckets, placed on a flat car. The car was moved back and forth along a 1,100-foot track running the length of the locks, as needed, and the loaded buckets were then spotted to exact pouring position by a big traveling crane.

Engines Convertible For Use With Any Fuel

A new line of engines has been announced by Waukesha Motor Co., Waukesha, Wis., intended for use with oil, gasoline, butane, producer or natural gas as the fuel, and every engine in this new Multi-Fuel Poly-Cycle series is convertible after its manufacture by simply changing the fuel-burning accessories. It was discovered after nearly ten

years' development and refinement of the Hesselman type of spark-ignition oil engine for industrial service that, by a rearrangement of the manifolding and a relocation of injection and spark-plug equipment, this oil engine could be equipped with a carburetor and become an efficient gasoline engine. While conversions of industrial engines from diesel oil to natural gas have been common practice in the oil fields for many years, the plan to combine the manufacturing economies of quantity production on gasoline engines with oil-engine production was decided upon only after a survey of the truck and bus field showed that operators were unable to adopt the diesel engine in many cases because of the inherent sizes and weight as well as the high first cost.

Among the advantages claimed for these new convertible engines are greatly reduced maintenance and service costs because of the interchangeability of service parts as between gasoline and oil engines and the large quantity production. Rods, bearings, pistons, rings, pins, valves, camshafts, crankshafts, crankcases, cylinder heads, in fact all of the major parts, are the same whether the engine is an oil engine or a gasoline engine.

The first of the series is a six-cylinder truck engine of 525-cubic inch displacement with an output of 125 hp at 2,100 rpm. Full details and dimensions may be secured direct from Waukesha.

P&H BACK FILLERS



Speed Up Completion of Pipe Laying Jobs!

This P&H Back Filler will really save you time and money on those trenching jobs. Its easy adaptability to other types of handling jobs makes it one of the most practical low-cost units ever built. It's as mobile as a tractor, too—providing three forward travel speeds, ranging from 1.3 m.p.h. to 5.2 m.p.h.

These all-purpose P&H machines are available for rent or sale, both new and used at attractive prices. It will pay you to write for full information on how easy it is to own or rent a P&H Back Filler. Send today for all the details. The Harnischfeger Corporation, 4419 W. National Avenue, Milwaukee, Wisconsin.

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Digging and Cleaning All Types of Ditches

The extensive soil conservation program of the Federal government and the many irrigation and drainage projects now underway over the entire country are making the subject of building and maintaining ditches and canals of importance to an ever-growing number of engineers and contractors. Bulletin No. BR-1, issued by the Bucyrus-Erie Co., South Milwaukee, Wis., describing the effective service which can be rendered by the Bucyrus-Ruth excavator and illustrating what can be done with this machine, is available to readers of this magazine free on request. Whether cleaning weeds from a ditch or removing a heavy deposit of silt, this machine is effective and economical in operation.

New Road Equipment Catalog

A new 16-page catalog describing equipment for the construction and maintenance of highways has been is-

sued by the White Mfg. Co., Elkhart, Ind. Portable asphalt plants, pavement repair trucks, material dryers, concrete vibrators, asphalt and tar heating kettles, kerosene torches, concrete mixer heaters and other equipment manufactured by White are described and illustrated.

Copies of this catalog No. 32 may be secured direct from the manufacturer or from this magazine.

Do you wish a really superior dumping unit for handling 2-cu. yd. Detachable Buckets?

SEE OUR MODEL LF
(Load Forward)

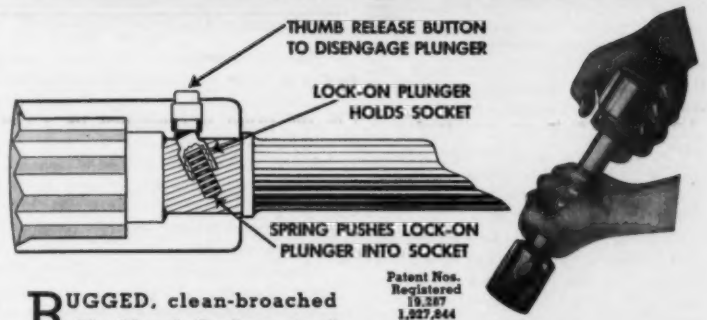
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For any 1 1/2-ton truck
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All the load on the chassis

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Only BLACKHAWK WRENCHES have Patented "Lock-On" feature for SAFETY and SPEED



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RUGGED, clean-broached Blackhawk Sockets stand the gaff of toughest jobs — big range of sizes from 3/16" to 3 1/2", with all socket handles and attachments. The complete Blackhawk line also includes box types, stub end box types, open ends, tension indicating wrenches — every type to speed up construction and equipment maintenance.

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Blackhawk's exclusive "LOCK-ON" feature clicks sockets, handles and attachments into one solid tool. A spring-backed plunger in drive end of all handles holds sockets securely. Sockets are quickly disengaged by simply pressing the convenient "Thumb Release" button on the socket. "LOCK-ON" saves time and temper, avoids damage and injury — makes for fast, safe and sure work.



Speed up construction — save maintenance time — with Blackhawk Heavy-Duty Ratchet Wrenches. Built to handle stubborn jobs.



No. 14BD SET

Fifteen piece set—indispensable for equipment maintenance and heavy construction. Eleven sockets — range from 1" to 2". Husky steel case. \$28.56 to user.

SAFETY — plus top performance — with "LOCK-ON." Blackhawk Sockets can't fall off to injure men or damage work.



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BLACKHAWK
WRENCH CATALOG
for Construction
and Engineering

BLACKHAWK Wrench Specialists



Roadside Mowing with a Power Mower
on a Connecticut State Highway

Roadside Development On Connecticut Roads

(Continued from page 7)

are evidence of fine cooperation.

Safety and Economy

Quite logically safety and economy must be the watch words of all highway practices. Every roadside-development and maintenance operation is carried on with this idea predominant. Let us take for example the following development items.

Slope stabilization and erosion control are closely allied. Slopes that have been successfully stabilized can generally be proofed against erosion. The introduction of underground and surface drainage, where needed; the construction of necessary cribbing and masonry walls in conjunction with slope flattening and rounding; loaming, seeding and planting are usually successful in stabilizing and in controlling erosion on slopes. Thereby maintenance costs are lowered and the potential hazard of unstable earth and rock sliding into the traveled way is greatly reduced. In addition, the appearance of such roadsides is improved.

Turnouts constructed just off the traveled portion of the roadway at locations selected for their command of outstanding scenic views help to eliminate the danger of promiscuous parking and if included in the original construction, the cost is slight. Picnic areas placed advantageously along the roadsides with adequate parking areas definitely further the cause of safety. The addition of suitable tables, drinking water, fireplaces, and sanitary facilities increase their recreational value. Ordinarily portions of the right-of-way not immediately needed for other purposes can be utilized for these areas. Such picnic spots are held in high favor by the motoring public and are valuable assets to any highway system.

Screen plantings of carefully selected evergreen and deciduous trees and shrubs are definite necessities in traffic circles with directly opposite traffic lanes, in order to block out opposing headlight glare. It has been noted that several large rotaries so constructed and not planted were continually crossed at night and it was obvious that opposing

headlight glare was responsible. Since the installation of screen plantings at these locations, over 2 years ago, not a single accident of this kind has been recorded.

The growth of the dual-lane divided highway has increased the use of screen plantings in the center park strip to eliminate the troublesome headlight glare of on-coming traffic. In many places screen plantings are used with great success as snow barriers.

The application of landscape principles to the selection of types and to the location of these plantings adds much to their aesthetic as well as to their safety value.

In highway maintenance, safety and economy are still the predominant factors. First, the inevitable rock cuts found on so many roads are constant sources of hazard. Vines pocketed around them doubtless prevent the dislodgement of many shattered sections as well as soften the severe aspect of the barren outcrop. Nevertheless, the continued action of frost and rain necessitates the repeated patrolling of these locations and extensive removal operations by the roadside maintenance forces.

Also it is essential that sight line clearance be maintained at all times. This is done by selective thinning and repeated mowing of rank vegetation. Landscape crews trained in selective trimming technique can speedily solve this problem, and the removal of offending growth on horizontal and vertical curves in wooded sections can be effectively accomplished with no apparent disruption of the balance of nature. Growth at intersections can be quickly eliminated by scythes and power mowers.

Mowing Along the Highways

Mowing constitutes the major operation in roadside maintenance. The modern highway with its wider right-of-way, center park strips, and rotary traffic circles has greatly increased this task. Fortunately the flattened slopes and wide center strips allow for the use of horse or power mowing machinery, thus eliminating much of the hand mowing with its attendant cost.

Just how to proceed with mowing operations is problematical. It is essential to maintain the roadsides sufficiently to insure against sight-line obstruction, fire hazard, and the blocking of water ways. The appearance of the roadside, too, must not be overlooked. It is the

practice in certain states to mow back to the property line, conserving only such wild flowers as may be in bloom at the time of mowing. This procedure may have merits but, on the other hand, selective mowing which allows for the maturing of such later blooming flowers as golden rod and asters is worth consideration. These plants grow profusely all through eastern United States and when allowed to flourish along the highways considerably increase the attractiveness of the roadsides. The aim of all departments is to keep the cost of mowing to a minimum without the sacrifice of beauty and safety.

Care of Trees

Shade trees growing along the highway certainly contribute immeasurably to the landscape value and no roadside-maintenance program is complete without adequate provision for their care. The hosts of insect pests and the innumerable plant diseases which attack trees, coupled with the unhappy location of many of them planted long before the advent of the automobile, call for unceasing attention. It is imperative to remove dead and dangerous trees and branches, systematically fertilize, spray, prune, bolt and cable. Only through judicious care can it be hoped to keep roadside trees in a safe and healthy condition. They are grateful for reasonable care and will respond with added beauty to the highways.

Proper Organization Necessary

Roadsides properly developed, pleasingly planted and economically maintained can be achieved only through proper roadside-development organization, and then only when close cooperation with the other units of the department is enjoyed.

From a paper presented before the Association of Highway Officials of the North Atlantic States, in New York City.

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Endorsed and Adopted by Road
Builders and Contractors

Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.

SAND'S LEVEL & TOOL CO.
8531 Gratiot Ave. Detroit, Mich.

Nominations for the 1939 Roadside Development Awards must be mailed by September 15. Nomination blanks will be sent to all state highway departments on August 31.

THE YEARS HAVE PROVEN
the Dependability of

SYNTRON

ELECTRIC TOOLS

as well as their
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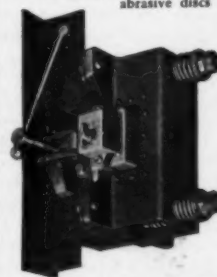
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IN 6 SIZES

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• MAINTAINERS •

Back in August, 1908, Baker introduced the first light road grader and the first successful self-loading scraper, the Maney, which marked the beginning of a new era in earth moving operations.

Next came Baker light steel snow plows, followed by the first practical tractor scrapers. One important advance followed another—tripping blades for snow plows, bulldozers built for tractors, the development of hydraulic equipment.

This same pioneering spirit, aided by advanced engineering and modern production methods, keeps Baker Equipment ahead today.

Write for Bulletins on new Baker Hydraulic Scrapers in 3, 5, 8 and 10 cu. yd. capacities (all with the flat digging angle)—Hydraulic Bulldozers, Graders and other Baker products.

THE BAKER MFG. CO.
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• BULLDOZERS •

Used Equipment for Sale

Buckeye Ditcher Model No. 4. Maximum
24" x 6' 10". 40 hp. Good condition. In
Detroit area. Immediate shipment—\$900.
Write to:

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Contractors and Engineers Monthly
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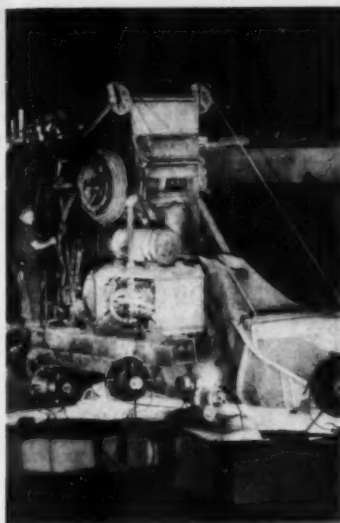
For Sale or Trade

2-18-20-yd. LeTourneau Carry-all Scrapers,
excellent condition. With or without Cater-
pillar RD8 Tractors. Or will trade for
smaller tractors and scrapers.

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Portable Floodlights and Homelite Generator Light the Work of a Paver

Portable Floodlights Serving Construction

To increase the efficiency of any construction job and to be ready for servicing equipment at night, the job must be adequately lighted. It is not possible to have permanent lines strung all over any construction job to furnish electric current for floodlighting. To overcome this, the Homelite portable generator, complete with built-in gasoline engine, has been developed for operating portable floodlights which can spot the work, making it as brilliant as by day, according to the manufacturer.

Homelite portable generators are made in 650, 1,250, 1,800 and 3,000-watt capacities in the direct-current models and in 500, 1,000, 1,500 and 2,500-watt capacities in alternating-current models. These generators, with the engine, weigh only from 71 to 125 pounds complete.

They are fool-proof in operation and have even been flooded out without damaging the machine. During the day they furnish sufficient current to operate electric tools such as drills, saws and hammers, one generator furnishing sufficient current for driving several of these tools at the same time. There are several convenient outlets in the generator and, since it is easy to carry, it can be quickly moved about, doing away with the necessity of long troublesome cables.

Complete information on portable generators and floodlights may be secured from Homelite Corp., 45 Riverdale Ave., Port Chester, New York, by asking for Bulletin No. 200B.

A New Assembly for Wet Battery Ignition

The latest development of the Barco Mfg. Co., Chicago, Ill., is a new cable assembly which makes possible the operation of its portable gasoline hammer with a wet battery as well as with a dry battery. Owners of dry battery models of the Barco hammer can easily change them over for wet battery operation, the use of which, according to the manufacturer, affords increased efficiency and economy, particularly on continuous hammer operations over a long period of time.

One of the features of this cable assembly is the spark coil container which is streamlined, water-tight and attached to the hammer by 5 feet of cable. As it is very light in weight it is not noticeable in the handling of the hammer. Furthermore, by placing the coil in the line in this manner, the wet battery can be placed at any convenient location, thus giving the operator maximum freedom of operation. A ventilated steel battery box, which will accommodate almost any standard 110-ampere 6-volt battery, is supplied with the new cable assembly.

New Power Shovels Announced by Byers

A new half-yard convertible crawler power shovel weighing 30,000 pounds and powered by a 50-hp 6-cylinder motor, as well as a new $\frac{5}{8}$ -yard shovel weighing 32,500 pounds, powered with a 60-hp 6-cylinder motor, have been announced by The Byers Machine Co., Ravenna, Ohio. The half-yard shovel has a safe crane lifting capacity of 12,500 pounds at 10-foot radius on a 30-foot boom, while the $\frac{5}{8}$ -yard unit lifts 13,000 pounds.

The trench-hoe attachment has a 17-foot boom, a 7-foot 9-inch stick, and either bottom or front dump buckets of various cutting widths. A single-purpose skeleton trailer of new design is also available for transporting these machines. On crane or dragline operation these models always have the travel clutches ready for immediate engagement, thus providing a time-saving advantage.

The new catalogs on these Models 65 and 75 feature four hook rollers on the turntable, roller bearings on major shafts, unit alloy steel casting construction, positive independent cable or chain crowd shovel attachments, improved speeds, well ventilated cabs and ability to swing while traveling.

250 Billion Miles Traveled On U. S. Highways in 1936

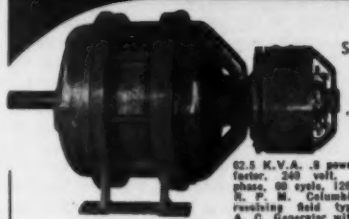
Motor vehicles traveled a total of 250,000,000,000 miles in 1936 and the average vehicle traveled 8,870 miles, according to an analysis of road use made by the Public Roads Administration (formerly the U. S. Bureau of Public Roads). The analysis is based on data from seventeen states obtained in the course of the highway planning surveys being conducted in cooperation with state highway departments.

The mythical "average vehicle" traveled 5,000 miles on primary rural highways, 1,190 miles on secondary highways and local rural roads, and 2,680 miles on city streets. However, there was a wide variation in the use of the different classes of highways by urban and rural residents. Vehicles in small towns were used largely outside of cities while those owned by city residents performed a large part of their travel on city streets. All vehicles except those in the largest cities used the primary rural highways more than all others.

The analysis shows the importance of primary roads to city residents. Seventy-one per cent of the travel on such roads originated in incorporated places, and only 4 per cent of the travel on city streets originated in unincorporated areas. The Public Roads Administration

reports that it is apparent that provision of adequate rural highway facilities today is of major importance to the city motorist and that the required improvements in those facilities are largely occasioned by the city motorists' demands on the primary system.

COLUMBIA A. C. GENERATORS



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SPEEDS: 1800, 1200, 900, 720, 600, 514, 450 R.P.M.
SHIPMENT: ONE WEEK TO 10 DAYS.

Driven by Diesel or gas engine, Columbia Generators furnish power and light where current is not available and are also used for stand-by service in event of power failure. Compactly built, they are easily portable. Write for bulletin describing their dependable construction.

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● Heltzel heavy duty battered curb forms are the simplest to set and fastest to strip because all stakes are driven straight down. Catalog S-20-F.

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Why NOT an Etnyre!

Problems of Work At Alaska Airport

(Continued from page 19)

10-inch logs with the branches cut and laid flat, down to 3/4-inch willow or alder brush. The covering may be of anything from pit-run gravel down to earth or, for tractor use, merely squares of heavy sod. In real tundra country there are no suitable trees, the heaviest growth being alder brush as was used in this case. The branches, with a maximum diameter of 2 inches, were very crooked and deformed from wind and the weight of wet snows.

Troubles Start Also

An engineer visited the job on June 23 and found that the pit had been stripped about 18 inches, to frost, over an area 100 x 400 feet; the road, about 600 feet in length, had been built; and the fill had been constructed about 18 inches deep over an area 100 x 120 feet. Although a 10-foot face at right angles to the bank of the river had been developed in the pit, permanent frost was found and the foreman was at a loss to secure other material. Only one shift was operating.

One of the greatest difficulties was that of making the road hold up for hauling. The recipe for the trouble might be described thus: put a bunch of crooked springlike alder brush on a soft wobbly surface over frost, cover them with a foot or two of the finest type of silty sand, add a downpour of rain, and start hauling 3-ton loads over the road. The sand went down and the alders came up while chuck holes 2 feet deep developed in short order. Another layer of alders with another layer of sand did the same thing when it rained again.

On the 25th, after it had rained less than half an hour, the foreman closed down all operations. Delays from breakdown of equipment had been anticipated in the original estimate, but not delays from rains. To get through on schedule, the work had to go on, rain or shine.

Across the river were several thousand FBM 2 x 12-inch fir planks destined for use as bridge decking further up the river. These planks were secured and made up in sections of two planks with three cleats to hold them together and were laid end to end. After smoothing out the sand, two such strips at the proper gage made firm fast tracks. Where the trucks had been going up the road partly loaded and in compound low, they then moved at 20 miles an hour with a heaped load. The rain had no effect.

However, other difficulties shortly presented themselves. Building a road, particularly with sandy silt, over tundra without the use of corduroy was an unheard-of procedure. Building the runways of an airport was practically the same problem; it couldn't be done. When the fill was first started, the solid frost was very near the surface and everything went along nicely. Then the sun came out and the frost level went down; intermittent rains coupled with heavy loads "worked" the mass over the top of the frost. The entry onto the field became rubbery and black spots of tundra started to show through the fill. Unless something was done, the finished job would be a sand fill with spots of soft tundra, hardly suitable for landing airplanes.

First, endless loads of fill material were dumped in the entry way at the corner of the field. The drivers were ordered to take a different track each time after leaving the end of the plank track. This seemed to work for a time, but soon the tundra became a loblolly. One could jump up and down and see

the ground move 25 feet away. The answer seemed to be to extend the plank road down the field to a point near the dump, and to continue extending it as the fill area was enlarged.

Confronted with his frozen pit, bobbing tundra and inexperienced crew, the foreman became discouraged, disheartened and finally threw up the sponge. The engineer took over and tried out an expert bulldozer operator, who had been sent for by plane, as foreman. It later proved that this man was the heart of the job, although an engineer-foreman was later placed in charge.

A road on an easy grade was constructed down the bank of the river by the bulldozer, extending to a sandy beach. The shovel worked from this road into the frost line of the face which was found at about 6 feet. As the area stripped was 400 feet long and the bank 40 feet high, it was anticipated that by the time the face was excavated

(Concluded on next page)

Good Roads Takes Over Manufacture of Dumpers

Good Roads Machinery Corp., Kennett Square, Penna., has been granted exclusive rights for the manufacture and sale of the Speed Dumper truck winch and multiple bucket equipment originated by Speed Dump, Inc., New York City. A series of demonstrations of Speed Dumpers for loading, hauling and dumping earth, rock and similar materials is being given throughout Good Roads' eastern territory.

Local Contractor Building Saugus Sewage Force Main

John MacDonald Construction Co., East Saugus, Mass., is the contractor for the sewage force main extending approximately one mile from Lynn Marsh to the sewage pumping station located within the Town of Saugus, Mass. This 22-inch outside diameter steel line is

being constructed of National Tube seamless steel pipe with plain-ends prepared for Dresser couplings. It is to be operated on a maximum pressure of 80 pounds per square inch. Hill, Hubbell & Co., Division of General Paint Corp., Cleveland, Ohio, is supplying the wrapping and lining materials for this steel sewage main.

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WELL POINT SYSTEMS
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combine the requisite features of
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A MOUTHFUL AT EVERY BITE

Difficulties Delay Alaska Airport Job

(Continued from preceding page)

to frost along the entire 400 feet, the starting point would be thawed sufficiently to repeat the operation. This thought relieved for the time being at least the fear of not being able to secure sufficient material. Actually, in two weeks the face had thawed only 15 inches, the sand refused to slough off and there the frost line remained. However, the day was saved by the discovery of pockets of thawed material in the bank where the shovel could work in as much as 20 feet, and later by extending the length of the pit, dug in from beach level.

Other Difficulties

Other troubles were constantly cropping up. The inexperienced truck drivers were jerking the rear ends out of the new trucks by getting them stuck in the loose sand when backing with their loads. The clutch on the shovel went "haywire" after a week's operation and a bulldozer arm cracked off in two weeks. Three trucks were down at one time. At other times the drivers were hand-shoveling until a trap was erected which, with the bulldozer, was used for loading until the shovel was repaired.

Most of the mechanical difficulties were due to the inexperienced crew and the peculiar job conditions. A mechanic hired for repair work had never seen an oil-burning tractor. There were no repair facilities available at Bethel but a gold dredging outfit 75 miles distant had a fairly complete shop. It proved expensive, however, flying parts back and forth. Finally an experienced service man was secured, which helped matters considerably.

The rainy season started in August and, with the saw mill operator unable to get logs for lack of credit, no more planks could be purchased. More trouble was experienced in hauling. At such times, material was piled high and deep and spread later.

Completion At Last

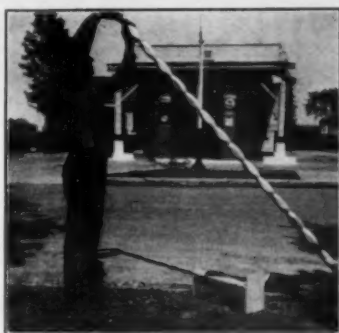
Although the first plane landed on the field on July 11, when it was only 700 feet long, the runways were not completed until November 10. Special equipment could have done the job more quickly and efficiently and probably less expensively, excluding the equipment cost. But the requisite equipment would have taken up most of the appropriation and much of it would not have been used again.

Reports during the winter indicated that all the work had been to no avail and that, due to dry weather and high winds, the field was blowing away and the sand ruining airplane motors. Although these reports proved to be greatly exaggerated, it was true that a small amount of sand had drifted and that the motors sent up clouds of dust. To remedy this, 300 pounds of grass seed were sown in the spring.

In spite of all difficulties, Bethel now has an airport.

New Equipment Dealer

W. L. Gibson, formerly with the Contractors Machinery Co. of Detroit and Grand Rapids, Mich., has established a new dealership in Toledo, Ohio, to serve the surrounding territory. This new company, Construction Machinery & Supply Co., is located at 617 State St., Toledo, and will represent such well-known companies as Byers Machine Co., Chain Belt Co., Flexible Road Joint Machine Co., Heltzel Steel Form & Iron Co., Sullivan Machinery Co., and a number of others.



Installing Overton Flexible Guards on a Guy Wire

Guards for Guy Wires A Real Safety Measure

Most cities have ordinances requiring protective guards on guy wires of telephone and other poles carrying wires through city streets. The guy cables for large derricks on construction projects are also a hazard and should be made particularly visible to individuals and operators of mobile equipment, including trucks, so as to prevent accidents. The Overton Flexibal guy guard is an easily installed readily visible protective device made by S. E. Overton Co., South Haven, Mich. It consists of spindles 6 inches long and 2 1/4 inches diameter

made of seasoned hardwood and finished with durable aluminum paint. They are so slotted as to slide over the guy wires and then are held in place by two hot-dipped galvanized nails which are inserted in drilled holes. A set consists of fourteen spindles and one positive cable clamp for a 7-foot guard length.

When in place these Flexibal guards form a series of bead-like spindles carried to the necessary height and do not require maintenance. The only tool required for their installation is an ordinary hammer. The roller-shaped spindles are readily visible both day and night and when struck in any manner their rounded surface makes injury improbable.

New Bulletin Issued On Hydraulic Scrapers

The Baker Mfg. Co., 585 Stanford Ave., Springfield, Ill., has just issued a new bulletin on its line of Baker hydraulic scrapers, a feature of which is the flat digging angle to reduce the power necessary to obtain capacity loads. These scrapers are available in 3, 5, 8 and 10-cubic yard capacities for use with tractors of 25 to 75 horsepower.

Copies of this Bulletin 815 may be secured by those interested direct from the manufacturer or from CONTRACTORS AND ENGINEERS MONTHLY.

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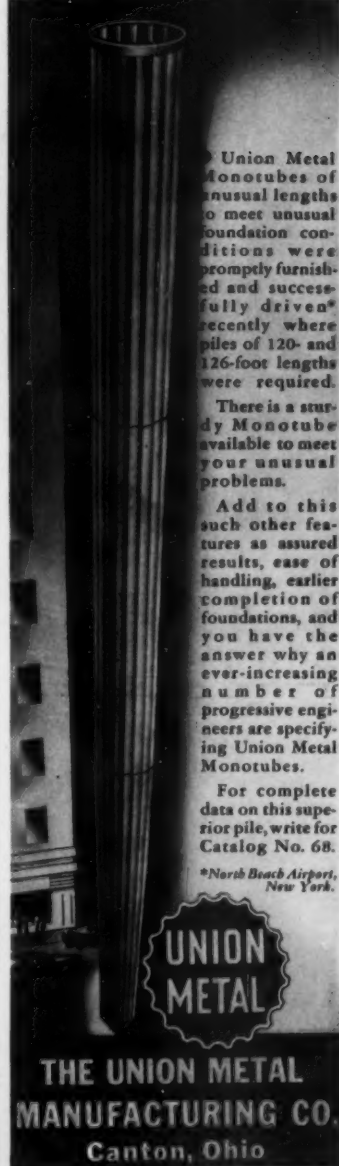
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*North Beach Airport, New York.

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Contractors and Engineers Monthly



This Scene in Lassen Volcanic National Park May Serve Two Purposes: First, to Cool You Off on a Hot Summer Day and, Second, to Remind You That Winter and Its Snow Removal Problems Aren't Far Away.



The Connecticut State Highway Department Has Found That Screen Planting on Traffic Circles to Block Out Headlight Glare Has Resulted in Reduced Accidents. The Typical Example Above Serves the Double Purpose of Providing Safety and Beauty Along the Highway. See Page 7.



A General View of the Houma Canal Bridge on U. S. 90 in Louisiana from the Official Grand Stand Built by Robinson & Young, Contractor for the Bridge, to Insure a Uniform Series of Progress Photographs. See Page 2.

C. & E. M. Photo



C. & E. M. Photo

Hospitality at L. O. Brayton Construction Co.'s Camp. Lytle Brown, Jr., Superintendent, Draws a Draught of Main Water—That's All They Had to Drink! See Page 1.



Before and After—a Highway Relocation Project on U. S. 395 in Oregon, for Which M. L. O'Neil & Son Was the Contractor. A Fleet of Caterpillar Tractors with Bulldozers, Scrapers and Rippers Moved 260,000 Cubic Yards of Earth on This 2.1-Mile Project. The Cut at the Point Shown Above Was 65 Feet.



The 55,000-Yard Rock Out Near Tuscarora, Penna., Taken Out by Verbitsky Brothers of St. Clair, Penna., with One Shovel in Less than Three Months. See Page 23.



An Allis-Chalmers Speed Maintainer Handles the Spring Maintaining in Dimmick Township, LaSalle County, Ill. This Township Has 48 Miles of Road to Maintain.



C. & E. M. Photo

A Long Stretch of Bubble-Masonry Toe Wall Along Merced Canyon Highway. See Page 23.

Right Hand
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21.10.10

Out by
see then